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Journal of English and Foreign Literature, Science, and the Fine Arts.

No. 678. LONDON, SATURDAY, OCTOBER 24, 1840. PRICE FOURPENCE, (Stamped Edition, 5d.)

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October 22, 1840.

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Age.	£ s. d.	Age.	£ s. d.	Age.	£ s. d.
25	1 18 6	35	2 10 11	45	3 9 4
30	2 1 4	40	2 18 8	50	4 4 2

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LIFE DEPARTMENT.—The attention of the Public has, in the advertisements and proposals of this Company of late years, been called to a Table of Additions applicable to and expectant on Policies of particular dates and ages; the Directors now beg to submit the following statement of Claims *actually paid*, shewing the Sums respectively assured and the Bonuses thereon, and they request, in order to shew the advantageous plan of Assurance proposed by this Company, that Persons desirous of effecting Assurances on their Own Lives or on the Lives of Others, will compare the statement now submitted, with the Addition or Bonus of any of the other Offices which may apply to a Policy issued by them since 1810, when the Atlas Company adopted the Bonus System.

Statement of Claims paid on Policies effected in London or through an Agent in Great Britain.

No. of Policy.	Name of Life Assured.	Term during which Bonus accrued.	Sum Assured.	Bonus.	Total amount paid.	Bonus per Cent. on the Sum Assured.	Bonus equal to the undermentioned per Cent. per Annum on the Sum Assured.
			£.	£.	£.	£. s. d.	£. s. d.
213	H. M. William IV.	14	3000	1068	4068	35 12 0	2 10 10
69	H.R.H. the Duke of York	7	2000	385	2385	19 5 0	2 15 0
92	The same.	7	3000	577	3577	19 5 0	2 15 0
3422	The late Duke of Argyll..	14	5000	1453	6453	29 1 2	2 15 2
2604	The late Earl of Clarendon	12½	2500	1130	3630	44 16 0	3 11 8
M. S. (Berks)		21	400	437	837	109 5 0	5 4 1
1202	Sir John Dean Thomson, G.C.B.	21	500	308	808	61 12 0	2 18 8
1103	Rev. Joh W. Baugh	21	1500	767	2267	51 2 7	2 6 8
1578	Rev. Thomas Crompton..	20	500	350	850	70 0 0	3 10 0

Persons assured for the whole term of Life in *Great Britain* or *Ireland* respectively, will have an Addition made to their Policies every seventh year, or an equivalent Reduction will be made in the future payments of Premium, at the option of the Assured. The Fourth Septennial Valuation was made up to Christmas 1844.—Assurances for short periods may now be effected in this Office at considerably reduced rates of Premium.

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The Company's Rates and Proposals may be had at the Office in London, or of any of the Agents in the Country, who are authorized to report on the appearance of Lives proposed for Assurance. HENRY DESBOROUGH, Secretary.

92, Cheapside, 21st Dec. 1839.

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SCOTTISH UNION FIRE and LIFE INSURANCE COMPANY, No. 449, West Strand, and No. 78, King William-street, Mansion House, London; George-street, Edinburgh; and Dame-street, Dublin.

Instituted 1824, and Incorporated by Royal Charter.

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J. Gordon Duff, Esq.	Hugh F. Sandeman, Esq.
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S. Mackenzie, Esq. Manager.

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Every Policy issued by this Company renders it imperative on the Directors, in the event of dispute or difficulty arising, to refer the question to arbitration.

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FIRE DEPARTMENT.

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This Incorporation effects Life Insurances either at Reduced Rates without Profits, or with Participation in Profits, of which two-thirds are returned at regular periods, without being subject to any deduction for charges of management.

Tables of Rates and every information may be had at the Company's Offices; or of the Agents throughout the Kingdom.

No. 449, West Strand, and F. G. SMITH, Secretary.
No. 78, King William-street, City.

SCOTTISH UNION FIRE INSURANCE COMPANY.

EXTRACT from the Returns printed by order of the House of Commons, showing the amount of FIRE INSURANCE DUTY paid into the Exchequer for the year 1839, by the following Insurance Companies carrying on the business of Fire Insurance in LONDON. Also the Farming Stock (which is free of duty) insured in the same period by each Company respectively.

	Total duty paid, 1839.	Sum insured on Farming Stock, exempt.
Sun	£158,689 15 2	£6,747,455
Phœnix	130,151 0 1	4,742,405
Royal Exchange	66,876 17 9	4,643,569
Norwich Union	66,874 14 10	9,452,178
County	45,100 7 5	6,482,414
Guardian	34,918 7 9	562,295
Globe	33,322 3 4	1,052,852
West of England	32,424 10 0	698,369
Imperial	28,222 6 8	319,240
Alliance	25,513 8 11	539,817
Atlas	25,122 2 4	905,157
SCOTTISH UNION*	20,502 5 10	837,682
Westminster	19,663 1 5	26,850
British	18,349 10 0	648,774
Union	18,212 10 1	235,567
London	13,259 13 2	150,607
York and London	11,384 15 4	600,209
Hand-in-Hand	10,996 2 2	—
Licensed Victuallers	5,210 9 10	—
Protestant Dissenters	3,840 15 8	74,485
Independent and West Middlesex	2,073 6 7	76,700
Benevolent	13 3 2	—

* Offices in London, No. 449, WEST STRAND, and No. 78, KING WILLIAM-STREET, CITY, where Insurances may be effected against Fire on the most liberal terms.

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Age.	Premium per Cent. per Annum payable during 1st Five years.	2nd Five years.	3rd Five years.	4th Five years.	Remainder of life.
20	£1 1 4	£1 5 10	£1 10 11	£1 16 9	£2 3 8
30	1 6 4	1 12 2	1 19 1	2 7 4	2 17 6
40	1 16 1	2 4 4	2 14 6	3 7 3	4 3 4
50	2 16 7	3 9 4	4 5 5	5 4 3	6 13 7

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20	£0 17 4	£0 18 4	£1 14 4
40	1 12 6	1 16 2	2 19 9
60	3 10 9	4 8 0	6 6 0
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20	£0 17 2	£0 18 4	£1 11 6
40	1 5 6	1 7 3	2 12 0
60	2 18 9	3 9 3	5 12 6
80	13 1 7	15 10 0	16 10 10

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20	£4 7 9	£3 4 3	£3 12 9
40	6 4 0	4 12 6	3 17 4
50	7 6 4	5 11 0	4 13 4

A FEMALE.

20	£4 3 0	£3 1 0	£2 9 9
40	5 13 8	4 3 10	3 9 8
50	6 17 2	5 3 0	4 7 6

Table of Premiums payable on a Seven Years' *ascending Scale*.

A MALE.

Age next Birthday.	Annual Premiums payable first 7 Years.	Annual Premiums payable second 7 Years.	Annual Prems. payable for remainder of Life.
20	£1 4 0	£1 9 4	£2 3 0
40	2 8 9	3 1 3	3 8 8
50	3 2 6	3 19 0	5 12 0

A FEMALE.

20	£1 4 0	£1 9 6	£1 16 8
40	1 16 10	2 7 0	3 6 2
50	2 11 3	3 4 6	5 9 0

Premiums payable on a Seven Years' *descending Scale*.

A MALE.

Age next Birthday.	Annual Premiums payable first 7 Years.	Annual Premiums payable second 7 Years.	Annual Prems. payable for remainder of Life.
20	£2 3 10	£1 14 6	£1 7 9
40	3 19 6	3 13 9	2 1 0
50	5 8 6	4 1 9	2 3 6

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50	4 17 8	3 13 3	2 2 9

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LONDON, SATURDAY, OCTOBER 24, 1840.

REVIEWS

The History of France—[*Histoire de France.*] By M. Michelet, Professor of History at the Normal School, &c. Vols. III. and IV. Paris.

THE life of nations, like that of individuals, is "a mingled web of good and ill together." In both cases, Fortune sells what she appears to give; and the most favourable circumstances in human affairs are purchased by some drawback, which detracts more or less from their value. Thus, the French Revolution presents such multisided phases to the philosopher, that nothing is easier than to find grounds for any possible judgment of that all-absorbing event; and we trust that we shall not be mistaken, as intending to strike the balance of its whole good and evil, when we confess that, up to the present moment, we are by no means satisfied with its influence on French literature. That the violence and the anarchy of its first outburst should have stopped for a time all closet pursuits, was inevitable; and that it should afterwards have revolutionized the public taste and judgment, was no more than might have been anticipated. None, however, could have foreseen, and few even now comprehend, the total suspension of studies that followed the establishment of the Imperial government. So absolutely did the stern necessities of war predominate during the reign of Napoleon, that the literary traditions of the country were nearly forgotten by the masses; and when, at the Restoration, a powerful reaction turned the whole energies of a new generation towards the culture of letters, the youth of France seemed cast upon the mighty ocean of thought, without chart or compass. Not only literature, but philosophy and politics, had so far fallen into oblivion, that a new series of experiments was rendered necessary, for re-discovering the very elements of a rational theory of those departments of mind, and for the formation of anything like a public opinion.

It is thus only that an explanation can be given of the strange and monstrous forms, alike repulsive to taste and to morality, with which the drama and the press of Paris have since teemed, and which seem to indicate a blind and guideless search after some new *ideal*, guessed at, rather than comprehended, either as to its means or ends. The present age, indeed, must be considered, in relation to the European continent, as an age of transition: it is the point between the old literature and the new—a new not yet evolved, whose precise form and pressure are still among the secrets of futurity; and it is not too much to assert, that generations may perhaps pass away, before taste and criticism shall have constructed a permanent and consistent system, and restored the wholeness of the national mind.

In this revolution, history has gained more benefit, and has sustained less injury, than any other branch of literature. The French imagination, heated and exalted by the stirring events of the Empire, was, at the Restoration, exactly in that condition necessary for the conception of great historical works, and for rendering their perusal popular. The new order of thought and feeling engendered by the Revolution, was further favourable to this species of composition, by forcibly turning the historian's attention into new channels. The people, raised by circumstances into importance, had obtained a value in the eyes of the philosopher, as well as the politician, and thus a new field was opened to investigation. Further, the historians of the new epoch, though, like other writers, wholly emancipated from the authority of their predecessors, were kept within some bounds by the matter-of-fact nature of their inquiry. The choice, indeed, remained open as to the manner of treating the subject, and the point of view from which it was to be considered; but the necessity for a searching criticism into facts, tended powerfully to restrain extravagance; and the natural connexion of events, as mutual causes and effects, refused to lend itself unresistingly to that delirium of the imagination, which has ruled unrestrained over poetry, philosophy, and fictitious narrative.

The historic productions of the present generation of Frenchmen are multitudinous, and as varied as they are vigorous and striking. The general characteristic, is a patient re-consideration of the ancient documents, and a persevering search after new ones. But departing from this common basis, history has, in the hands of the modern writers, assumed certain different forms, under the influence of the mental peculiarities of each. These may be collected into three general heads, matter of detail, or critical history, philosophic history, and picturesque history.

In the first of these departments, the object of the writer is to arrive at particular truths, and to recount them as they occurred, with only just as much of reasoning, as is necessary to the clear conception of the events, and the order of their occurrence. In the second department, the leading idea is the reduction of history to one complex fact—the ultimate dependence of the last recorded event upon the first. According to this conception, the existence of a nation, like that of a plant or animal, is composed of a series of developements, of which each is a necessary consequence of the preceding. In this system, the influence of special events is subordinated to that of ideas; the former are considered as the accidents, which, if they contradict the march of intellectual developement, are absorbed and lost in it; and, if they coincide, hasten only and facilitate, but are by no means the cause of the result.

The picturesque school, on the contrary, is less solicitous about the causes of events, than desirous of re-producing particular epochs, such as they existed—of representing society at any given moment, surrounded by its passions, opinions, habits, and even costume; and enabling the reader to see and comprehend them exactly as he may his own. The writers of this school attempt the fidelity of the chronicler, without his tediousness: they aim at being Froissarts, but Froissarts looking back on remote times, from the heights of modern civilization, with a more refined taste and a more comprehensive grasp.

It is unnecessary to remark, that the predominance of any of these conceptions by no means implies a total abandonment of the others. Some detail of fact is necessary, as the substratum of reasonings, or to give meaning to pictures; nor is it possible in any case to avoid indulging in speculations on the causes of great events. It is, therefore, the predominance of the idea, and not its exclusive pursuit, that determines the historian's place in the classes alluded to.

Such is the developement given to the art of writing history in the modern French school. Still, however, historical composition has notwithstanding paid its tribute to the licence of the times—as is, we think, particularly observable in the work under consideration. M. Michelet, its author, who is of the picturesque school, must be considered as possessing great merit; for mediocrity does not excite enthusiastic admiration and severe censure. His 'History of France' is lively, imaginative, and amusing as the novels of Walter Scott; but it is infected with the worst faults of the literature of the day: in style, it is frequently extravagant—in thought, it is vague, dreamy, capricious, and not seldom trivial even to childishness. Seizing events and opinions only in some single aspect, its judgments of men and things are often false to the whole philosophy of the subject, so as occasionally even to give the impression of indifference to right and wrong, to truth, and to humanity; and all this is rendered more salient, by the general energy and clearness of the narrative of matters-of-fact, and the often happy illustrations of motives and causes, derived from a patient and effectual study of the new resources opened to the historian. Placed as M. Michelet is, at the head of the historic section of the National Archives, with their whole contents at his disposition, and impelled by duty, as well as by inclination, to avail himself of the advantage, he scarcely advances a fact for which he does not cite a contemporary authority; but the principal use he has made of his resources, is to embody the traits of social peculiarity which they contain, and to elaborate those colours for his palette, which are destined to give such force to his individual pictures. The advantage of this manner of treating a subject, besides the intimate acquaintance it produces with perhaps the most ethereal and evanescent portion of history, is, that it infuses into the narrative only so much of the author's individuality as concerns the artist. He sees with an artist's eye, and pencils with an artist's fidelity—his world is all objective. The philosophic historian, on the contrary, is liable to reproduce, along with the facts of the times to be recorded, the contents of his own mind, the philosophy of his own age. In his judgments on the causes of events, he is insensibly impelled to confer upon the personages of whom he treats, the ideas and the motives which are influential with himself: his world is subjective; and his history is strained through his own mental *formulæ* and acquired notions. He comes, too, after the events; and observing the consequences which have ensued, not unnaturally considers those consequences as having formed the motives of the agents. The picturesque historian has, therefore, this advantage over the philosophic, that if he does not give the whole truth, he is less likely to distort the truth; and that, inasmuch as he is less apt to think for his reader, he is less likely to lead him into habits of passive acquiescence.

Another great advantage of the picturesque method lies in the vigour and the brilliancy of the images it presents. The mind wanders in the perusal, in endless delight. Such works are literally picture books, amusing even to the eye of childhood. To compensate for these advantages, they have the defect of taking no more of the details of a subject than is necessary for the composition of the picture. The completeness of the story is sacrificed to the general effect, and those not previously acquainted with the events, are frequently at a loss to follow the author. This is eminently true of M. Michelet's volumes, which demand from the reader a competent knowledge of French history: for there is in his narrative a frequent subaudition of something which the reader is presumed to know, but which all readers are far from being acquainted with. In addition to this difficulty, M. Michelet has created another, by his tendency to the German idealism, and to its great literary mistake,—the using of language without sufficient attention to the meaning conveyed by it. A contemporary critic complains that M. Michelet's style is a series of poetical ejaculations; and that it cannot be translated into English without a frequent disregard of the author's own division of his sentences. This is perfectly true; but an ejaculation represents a feeling, not a

thought; and the necessity of fixing the original French sentences lies in giving the precision, no less than the sequence, to the ideas, which they want in the French. Were the ideas clearly conceived, they would be clearly expressed. Should any one attempt to translate Mr. Carlyle's habitual mannerisms into English, he would encounter the same difficulty, engendered, we believe, by the same cause. Indeed, we know not how better to communicate to our readers our objection to M. Michelet's peculiarities, than by referring to Mr. Carlyle's. Both writers are rhapsodical, and both employ neologisms perfectly unintelligible to those who are not adepts in the mystic school from which they are drawn. Wherever M. Michelet indulges in what he thinks philosophy, this defect becomes painfully prominent. There is a confusion in the unworked thought, a following of the will-of-the-wisp of metaphor, a mistake of figure for reason, which lead to much that is erroneous or trivial in the conclusion. This mannerism is gaining on a great number of our younger authors, and is so suited to flatter the half-thinker, and to tickle the ear of ambitious inexperience, that it is not to be passed over in a writer of such diversified excellence, and of so high a station, without a full exposition and a strong protest. We shall give, therefore, more than one example. The first is taken from the commencement of Chapter III., which opens the tragical story of the Templars:—

Gold (says Christopher Columbus) is an excellent thing. With gold we form treasures, with gold we procure everything desirable in this world, we carry even the soul to paradise. The epoch at which we have now arrived may be considered as the advent of gold; it is the god of the new world on which we are entering. Philip le Bel, on mounting the throne, excluded the priests from his councils to introduce the bankers. Let us not speak ill of gold: compared with the feudal property in the soil, gold is a superior form of riches. A little object, mobile, changeable, divisible, easily handled, easily hid, it is riches already subtilized. As long as wealth was immovable, man was by it attached to the earth as if rooted to it. The proprietor was a dependent on the soil, the earth carried with it the man. At present, the contrary prevails: man transports with himself the soil, concentrated in the form of gold. The docile metal lends itself to all operations commercial and administrative. A government (more especially) being obliged to act at great distances with rapidity, and in various ways, is especially dependent on the precious metals. The creation of governments at the beginning of the fifteenth century created a sudden and extensive demand for gold and silver. Under Philip le Bel the fisc, that monster, that giant, was born—hungry, thirsty, and armed with teeth. It cried, like the Garagantua of Rabelais, at its birth, "food," "drink;"—the terrible infant whose hunger is not to be appeased, will, on necessity, feed on flesh, and drink human blood. It is the Cyclops, the Ogre of the Seine. Its head is called a grand council, its long claws are the parliament, its digestive organ is the exchequer. Its sole aliment is that which the people cannot procure for it: both have but one cry, and that is gold. * * The enthronization of gold in the place of God was renewed in the fourteenth century. The difficulty was to recover the indolent metal from the obscure retreats where it slept. It would be a curious history, that of treasure, from the time when it lay hid, under the dragon of Colchis, the Hesperides, or the Nibelungen; (after its sleep in the temple of Delphi,) in the palace of Persepolis. Alexander, Carthage, Rome, awoke and dissipated it. In the Middle Age it was again asleep in the churches, where, for greater repose, it took the sacred form of crosses, reliquaries, &c. Who will be bold enough to drag it out? Who will be clear-sighted enough to discover it in the earth, where it delights to dwell? What magician will evoke this sacred thing that values all things—this blind omnipotence, which gives possession of nature itself? The Middle Age could not attain to the great idea of modern times, to the notion that man creates riches. It searched for riches less in the form than in the substance. * * But notwithstanding the marvellous wealth of the Lullys and the Flamels, the gold so often discovered [by transmutation] disappeared as soon as found; carrying with it the life and substance of the man, which were staked on the crucible. It was then that the unfortunate alchemist called in the devil, the monarch of gold. The devil, persecuted with the Manicheans and the Albigeois, chased, like them, from cities, lived then in the desert. He caballed on the heath with Macbeth's witches. Sorcery, the disgusting abortion of the old religions, was at least an appeal not merely to nature, like alchemy, but to volition, (the evil volition, it is true,)—to the devil. It was a bad industry, which, being unable to create treasure by the operation of [man's] will upon nature, strove by violence and crime to obtain that which industry, patience, and intelligence, can alone procure. * * In the Middle Age, the true alchemist, the veritable sorcerer was the Jew,—the unclean wretch, he who could touch neither goods nor women, but they must be burned. Throughout this age, the Jew, persecuted, exiled, recalled, was the indispensable intermediate between the exchequer and its victims, pumping gold from the people, and yielding it up to the king with an ugly grimace. It was the Jew who volatilized wealth, and emancipated it by the invention of bills of exchange. * * To force the poor man to address himself to the Jew, required no less than the entire horrible pressure of the fisc. Between the fisc, thirsting for his blood and marrow, and the devil, who wanted his soul, he adopts the Jew as a middle term—who takes as a pledge his pound of flesh. The gold which the murderers of the son of man lend, must (in public estimation) be a bloody gold, anti-human, anti-divine, or, in the language of the times, anti-Christ. This anti-Christ, this anti-God, was destined to despoil God, that is, the church; the secular church,—the priest, the pope; the regular church,—the monks and Templars.

In this quotation, which we have been forced to abridge of many of its striking details, and in which we are not sure that we always comprehend the author, the thought itself, that there is a connexion between political concentration, an exchequer, and the consequent demand for a facile currency, is both profound and prolific. In the hands of a sober writer, who in endeavouring to render himself clear to his readers becomes so to himself, it would have received precious developements. But M. Michelet seeing only the picturesque forms he conjures up, wanders from image to image, from his financial ogre to his alchemist, and from his alchemist to his Jew, leaving the logic and the chronology of the matter to shift for themselves; and in his last riddle, concerning the destruction of the Pope by the pecuniary resources of the secular authority, Œdipus alone could follow him.

Let us, however, take another specimen. It concerns the revival of natural science in the time of Charles VI.:—

Nature and the natural sciences, long compressed by the genius of Christianity, were now about to revive. * * Nature, returning in spite of Christianity, comes under the form of sin, and is only the more enticing on that account. Not yet understood, and accepted not as a science but as magic, it exercised a murderous fascination on the intellect. The finite is about to be lost in the infinite variety of nature. Man gives without counting; nature, beautiful and unchangeable, receives all and smiles. * * Alchemy growing old in its search after gold, blows its bellows on to the end. It burns its movables, its books: it would burn even its children. Others meantime pursue nature under her most seductive forms. They languish in the search after beauty. But beauty flies them, like gold. Each of her attractive apparitions escapes from the grasp of men, vain and empty; but all vain as it is, it does not the less carry off with it the most precious gifts of man's being. * * So triumphs over the ephemeral creature, insatiable, indefatigable nature. She absorbs his life, his force—or if life remains, and the soul only fails, it is but an aggravation of ill. Man thus retains no more in life than the consciousness of his death. Having extinguished in himself his own interior god, he feels himself left by the god, and, as it were, an exception to the universal providence. Alone—but in the Middle Age man is not long left alone—the devil quickly joins him to usurp the place of God; * * and the mind enticed by a belief in follies, amused by false lights, and led away on all sides by a vain curiosity, gropes in the dark, and fears what it seeks. A strange epoch, when everything is believed, everything denied; and when a feverish atmosphere of sceptical superstition envelopes the sombre cities. The obscurity increases in their narrow streets, and the mist thickens amidst the fumes of alchemy and the witch's sabbath.

With infinite labour may be discovered, in this extract, an attempt to represent the "march of intellect" during a remote age,—the connexion by which thought developed itself, and new ideas rose, to give direction and character to the material revolutions of the times. But the philosophy of the design is lost in the mannerism of the execution,—in the halo of mysticisms and meaningless generalities, in which the author involves himself, and in the affected obscurities of his Germanized language.

Another example of the rigmarole occurs at the end of a lively and brilliant picture of the murder of the Duke d'Orleans by the Duke of Burgundy,—for a picture it is, rather than a narrative, so forcibly is it described:—

All the world, (says Michelet,) wept at the funeral,—enemies as well as friends. These are indeed, then, no longer enemies. At such a moment every one grows partial to the deceased. What? so lately young and full of life, and already passed! Beauty, grace, learning, eloquence! and all these but yesterday,—to-day are nothing! Nothing?.... He who yesterday seemed but a simple individual, may now be discovered to have had more than one existence, to have enjoyed a multiplied being infinitely varied. Admirable influence of death, which alone reveals what life was. The living man is simply regarded as he profited or injured; but when he dies, a thousand new aspects are discovered in him, and all the bonds which united him to the world are distinguished. Thus, when we tear down the ivy from the oak, we discover innumerable long fibres, which no force could separate from the bark in which they grew: they remain, broken indeed, but they remain.—[We are told, in a note, that this illustration is the result of an actual observation made in the forest of St. Germain, September 12, 1839; and the passage, we suppose, was written on returning home, for the purpose of making use of it. Here is a new occasion for Voltaire's note of admiration, "*et c'est ainsi qu'on écrit l'histoire.*"]—Every man is an humanity—an universal history; and yet this being, which belongs to an infinite generality, was at the same time a special individuality, a person, a being unique, irreparable, that nothing can replace. Nothing similar has existed before; nothing similar will come after. God never recommences. There will indeed, without doubt, come others. Nature is indefatigable in calling forth into existence new persons—better perhaps, but similar, never, never.

In all this we freely confess that we see nothing to admire. It is possible that under the operation of abridging and connecting the original, we may, by striving to be faithful, have destroyed what may be thought the eloquence of these *splendidi panni;* but if so, whatever injury we may inflict on the author, serves only to benefit the English reader, by placing in stronger relief the poverty of the thought, the utter ruin of the occasional truths glanced at and buried under a torrent of jargon and verbiage. To us it appears that such passages are composed under the guidance of the ear; and that the intellect pauses not, to take cognizance of the value of the thought, and of the very partial and limited extent to which it is either correct or applicable. We want but the diffusion of such a fashion, we want but the amalgam of the forms of an extravagant idealism, with the reigning materiality and speciality of booksellers' literature, to divest the public mind of all vestige of taste, judgment, and natural feeling, and to open a ready door to

the triumph of Humbug in all its most extravagant impositions.

One obvious consequence of this affected enthusiasm, of this hurrying forward from image to image, is a neglect, real or apparent, of the truth. Apropos to the murder of the Knights Templars, the author inquires how the Grand Master's denial, when at the stake, of the confession previously obtained from him by torture, is to be explained; and after one or two unsatisfactory conjectures, goes on thus:—

The principal accusation (the denial of Christ and spitting on the cross) turned on an equivoque. The prisoners might declare that they had denied Christ without apostacy. This denial (as many have witnessed) was symbolical. It was an imitation of St. Peter's; one of those pious comedies, with which the early Church surrounded its most serious acts, and concerning which tradition, in the fourteenth century, was becoming forgetful. But if this farce was sometimes performed with a culpable levity, it was the fault of the individual, not of the order—[and might conscientiously be denied by the Master on behalf of his brethren.] Thus, that order which most faithfully represented the symbolic genius of the middle age, perished the victim of an ill-understood symbol. This event is but an episode in the eternal war between the letter and the spirit—between prose and poetry. Nothing is so cruel and ungrateful as prose, at the time when it forgets the venerable poetic forms under which it has grown up.

To the indulgence of so childish a conceit as this, the author plainly sacrifices the great truth derived from human nature, and the concurrent testimony of all ages, that man under the influence of torture will admit anything; and that when relieved from actual pain, the natural feelings will return, and he will retract the avowals thus extorted, as being not less disgraceful than false. All the accusations brought against the Templars were of the most monstrous character,—acts, possible indeed to individuals, but clearly not so to large bodies, consisting of the foremost men of their age, the younger sons of the best houses. Such abominations, also, had been charged against the Gnostics, against the early Christians, and, in all ages, against some class or other, which it was necessary to calumniate in order to destroy. The falsehood of such charges in the abstract is an established axiom of philosophy; their special falsehood in the individual instance, is scarcely less than an historic fact: yet is this consideration frittered away to make room for a crotchet; and the awful lesson it reads on the infamy and inefficacy of a cruel criminal procedure, is rendered ineffectual. Is it possible, if this symbolic explanation were founded in fact, that clear traces should not subsist of an effort on the part of the accused to make the distinction in their own favour,—that the parties should have voluntarily submitted to an imputation of sacrilege that a word could avert?

So again, in noticing the Jubilee of Boniface VIII., the artist gets the better of the philosopher, and misleads him. The Church, he says, "found in this Jubilee the culminating point of its historic existence. In the crowd assembled were formidable men, ready to open a new world,—some, cold and unpitying politicians, like the historian Villani; others proud and ill-humoured, like Dante." The fact, that such men were present at the Jubilee, and that they not improbably derived from what they there saw, the disgust and indignation which caused them to prepare the way for a new order of ideas, would have admitted of profitable amplification. But this occasion is lost in pursuit of a rhapsody. "The Pope called the living to Rome; the poet convoked the dead in his *Commedia*. He made, there, a review of a consummated world; he classed, and he judged it. The middle age and antiquity appeared before him. Nothing escaped him. The word of the sanctuary was uttered and profaned; the seal was displaced and broken: it has never since been recovered. This revelation was the Divina Commedia, the Cathedral of Cologne, the paintings of the Campo Santo at Pisa. Thus art arrived to close an epoch of civilization, to crown it, and to lay it gloriously in its tomb."

Independently, however, of the mannerism of which we complain, we meet occasionally with some strange instances of wanderings of thought. Thus, in alluding to the reply which Themistocles made to the professor of mnemonics, "Teach me rather the art of forgetting," he observes, "that such a man should have said this seriously, I cannot believe. He would not, if so, have merited the eulogium of Thucydides, when he called him the man who could see the present and foresee the future. He who neglects, forgets, and despises, will be punished by the spirit of confusion. Far from foreseeing the future, he will not understand the present: he will see in it a simple fact divested of its causes," &c. Surely, it could not have escaped Mons. Michelet, that this exclamation, so common in the mouths of the unhappy, applies to the passions, and not to the intellect. We all wish to part with those recollections which cause regrets, but no one wishes to forget the antecedents necessary to a correct judgment of the present.

We have dwelt at this length on what we esteem the blemishes of M. Michelet's work, because they are marking facts in the history of modern literature, and because we think he is precisely the author likely to render them popular. His 'History of France' will doubtless prove a fascinating work. It is a most attractive panorama, admirably calculated to imbue the reader with the spirit of the times and of the events it exhibits; and though it will not supersede other French historians with the student, it will be accepted by him as an agreeable summary; while to lighter readers it will be an especial favourite. If the imaginative and poetic turn of the author's mind sometimes leads him away from the philosophy of his subject, it enables him to select from his laborious and multiplied reading those graphic and naïve details, which paint a transaction better than whole pages of duller narrative; and his reader is no less pleased with the rapidity of his insight into events, than with its distinctness. Though frequently garrulous, he is rarely tedious; and the specialities he adopts bring him to his point sooner and more directly than the grasping generalities of the philosophic historian. To illustrate this excellence, it would be necessary to cite the entire work; but as this cannot be, we will confine ourselves to one extract taken at hazard. It relates to the influence of commerce on the affairs of England and France under Philip of Valois and Edward III.

The new government of England, intimately allied with Flanders, calls to itself the commerce of foreigners. It renews the commercial charter which Edward I. granted to the merchants of all nations. France, on the contrary, could take no part in this movement. This alone explains the subsequent events. The secret of the battles of Cressy—of Poictiers—lies altogether in the counters of London, Bourdeaux, and of Bruges. In 1298, Marco Paulo taught that at twelve months' distance from Jerusalem there were polished states and mighty nations....In 1321 appeared the first work on commercial and political economy, the 'Secreta Fidelium Crucis,' by the Venetian Sanuto. His work is a strange jumble of religion and trade. In recommending the re-conquest of Jerusalem, he gave a list of the spices of which Jerusalem was the *entrepot*. A crusade, in effect, did take place; but a crusade of a new species. If you stop a vessel at sea, you no longer find in it a French *cadet* in search of a kingdom, but some Genoese or Venetian anxious to sell you sugar or cinnamon. This is the hero of the modern world; and not less a hero than his predecessor of the old time. To gain a sequin, he will risk as much as Richard Cœur de Lion did for St. John of Acre. The crusader of commerce has his crusade in all directions—his Jerusalem is everywhere. This new religion of riches, this belief in gold, has its pilgrims, its monks, and its martyrs. They watch, and fast, and abstain. They pass their best years in dangerous voyages, &c.....Commerce was not then an easy profession. After a pleasant voyage from Alexandria to Venice, nothing was yet done. To sell with profit, it was necessary to penetrate the north. Merchandise travelled by the Tyrol, by the shores of the Danube, to Augsbourg, or to Vienna: it passed between the gloomy forests, and gloomier castles, of the Rhine to Cologne; and there only the merchants returned thanks to God. There it was that the Hanseatic merchants traded with the Venetian; or the merchandise turning to the left, was transported to France, to the fairs of Troyes, Lagny, Bar sur Aube, Provins. Thence it might reach Bruges, the grand mart of the Low Countries, the city of seventeen nations. But [at the time of which we now speak] this French route was no longer tenable; Philip the Bel had passed his ordonnances against the merchants, had debased the currency, and attempted arbitrarily to regulate interest; and Louis the Hutin had imposed [ruinous] taxes on everything that was bought and sold. This closed the counters of Troyes. There was no occasion for an ordonnance to interdict all traffic with Flemings, Genoese, Italians, Provinceaux....The kingdom of France, in its great breadth, was almost impenetrable to commerce: the ways were dangerous, the tolls too exorbitant. The barons, indeed, robbed less; but the king's officers took their place; and the expression, "plundered like a merchant," became a proverb. The royal hand covered all; but it was felt only in the claws of fiscality. If an order were issued, there followed an universal seizure. Salt, water, air, rivers, forests, fords, defiles, nothing escaped the ubiquity of the Exchequer. While the currency was incessantly changing in France, it varied but little in England. The king of France, too, had failed in the attempt to establish an uniformity of measures;—that uniformity formed one of the principal articles of the English king's charter to the foreigners.... Even before this charter, strangers flocked to England; and when we contemplate the advance which commerce made there, in the thirteenth century, we are not astonished that, in the fourteenth, an English merchant should have entertained five kings....In the Middle Age, England was a purely agricultural nation. The English feeder and the Flemish draper, whatever might be the quarrels of princes, were firmly united. France strove to break this alliance; and the attempt cost her a century of warfare. With the king of England, the question regarded the succession to the French throne; with the people, it concerned liberty of commerce and the sale of English wools. Assembled round the woolsack, the Commons were less niggardly with the king, and voted him monies with good will. This mixture of chivalry and industry gives a whimsical aspect to the history of the times; the fierce Edward swears on the Heron the conquest of France. His chivalry, who in their grave folly make their vow to wear a bandage on one eye, but who are not so simple as to serve at their own expense, are but the mercenary agents, the travellers for the merchants of Ghent and London; and Edward himself must lay aside his pride to please them, and must join hands with his brother, the brewer Artevelde, and harangue the populace from a butcher's stall....Such was the strange character of the times, at once warlike and mercantile. Their history is, at the same time, an epic, and a tale—the romance of Arthur, and the farce of the Village Lawyer: everything is double and discordant. Contrast everywhere prevails; and prose and poetry are in perpetual contradiction. The two ages of interval, between the dreams of Dante and the dreams of Shakspeare, are themselves but the semblance of a dream. It is the Midsummer Night's Dream, where the poet mixes together heroes and artisans—where the noble Theseus figures by the side of Bottom the weaver, whose beautiful ass's ears turn the head of the fairy Titania.

Rambling as this kaleidoscope view of the age is,—and we have sacrificed some of its more

whimsical details, to accommodate it to our narrowing space,—it is impossible to give a livelier image of the important change then commenced in the relations of nations; and the picture is more worthy of notice, in consequence of the new developement which its principle has received in our own times. Since the battle of Waterloo, the merchant has assumed the direction of diplomacy; and the imperial Cæsar and the haughty Czar of Russia, no less than the shopkeeper sovereigns of France and of England, are bound over to keep the peace, at the bidding of the Rothschilds and Barings, the autocrats of commerce.

Having thus given the English reader some insight into a new style of historic composition, and signalized what we think there is in it of dangerous example to English imitators, there remains only to say, that the fourth volume brings the reign of Charles the Sixth to a close; and that the work is proceeding rapidly—to what extent it will run, is yet probably unknown to the author himself.

Poems, by the late John Bethune; with a Sketch of the Author's Life, by his Brother. Edinburgh, Black.

Strong, and saddening as strong, is the conviction which must sooner or later overtake every one who dispassionately examines the biographies of literary men, that the "calamities of authors," so plaintively bemoaned, are more frequently a consequence of weakness and want of high moral sense on the part of the sufferer, than of an inevitable and persecuting fate. Let "young gentlemen, sad as night, for very wantonness," rail against us as harsh and utilitarian, we are still unmoved. There is an inborn pleasure, a dignity, a consolation, in high aspirings, which more than compensate for worldly fortune or misfortune, be the possessor ever so lonely—be he ever so lowly—for Hope deferred, or Favour capriciously withdrawn. It is from no lack of sympathy, that we bid the noblest and finest spirits look within and upward, for reward and cherishing—in place of straining eye and ear, to catch the ephemeral applause of an ever-changing crowd. It is no rigorous formalism to assert that self-indulgence, in thought, and fancy, and creation, is not injured by self-denial in sensual enjoyment—and this is all our creed.

In proportion, then, as the generally low-thoughted views which are taken of the duties and responsibilities of literary men, be to us painful, welcome is any book illustrating the patience, the manhood, the meek and noble virtue of a man of genius. Such an one is before us; and the pampered and feverish children of town cliques and clubs, who set themselves to rail at Lady Fortune, because she does not always pamper them with *both* riches and pleasure, would do wisely to medicine their own spirits, by taking as a text for their meditations, this record of a poor author's life by a poor author.

Two years ago (*Athen.* No. 536), we had great pleasure in recommending to all who concern themselves with our popular literature, 'Tales and Sketches of the Scottish Peasantry.' We now find that a portion of that book was contributed by John Bethune;—and brotherly and beautiful is the feeling which has placed the pen in the hand of the survivor, that a record might not altogether be wanting of one "who lived poor, toiled hard, and died early." "The reader," says Mr. Bethune, in his preface, "will probably think I have been too minute, and detailed too much. * * For no inconsiderable share of what has been noticed, however, I can only expect to be pardoned; and when it is known that our feelings and pursuits were almost the very same, that we never knew what it was to have separate interests for a single moment, that we had buffetted, or rather been buffetted by fortune together from boyhood—that we had supped from the same table, sat by the same fire, and slept in the same bed, with very few interruptions, from the period of infancy—and that we were nearly the last of the name and race to which we belonged,—the reader may, perhaps, be inclined to extend that pardon to one who has now so much of deep and melancholy interest connected with the past, to ponder over." We may add, that the book is published, we believe, with the fond intention on the part of its author, to devote such profits as may accrue from it to raising a stone on which to record the name of his lost brother.

John Bethune, the son of a farm-servant, was born in Fifeshire, at the Mount which gave its title, as every reader of Scott knows, to Sir David Lyndsay, "the Lord's Lyon King of Arms." His life was spent within a circumscribed circle in the same neighbourhood: there he went to school—a heavy scholar, it seems, and slow to learn—there he began life as a herdsman—and though sometimes busy in boyish stratagems, to make "the cows run home that he might get quit of his task," other moments of his watch and ward were better employed, in thinking over the Old Martyr records of the times of the Covenant, or in recollecting the poetry of Burns, which had been read to him, and the metrical history of 'Wallace Wight' and the Bruce, which exercised so strong a spell as to excite him to learn to read with greater facility. Humble beginnings these! and hard the accompanying circumstances:—

"During the winter of 1823-4, to assist in supporting himself, he broke stones on the road between Lindore and Newburgh, along with his biographer. He was then under thirteen years of age; and when, from the intense cold which occasionally prevailed, and the lack of motion to which his employment subjected him, his legs and feet were almost frozen, instead of complaining, and making this an excuse for running home, as a number of boys would have done, I was frequently amused in no ordinary degree by the droll observations which he made, and the wild gambols to which he sometimes had recourse to restore the natural warmth to his benumbed extremities. From his father having been subject to disease of the bowels for a number of years previous, and the numerous expedients, all attended with expense, which had been resorted to for the purpose of restoring him, the family were at this time considerably in debt. Young as he was, he had already caught that spirit of independence which characterized him through life; and his enthusiasm now pointed forward to the time when we should be able to redeem these debts. To accomplish this object, there was no personal suffering, and no sacrifice of boyish pleasure, which he would not willingly have encountered; and thus he persevered at an occupation from which, in winter, even full-grown men might be excused for shrinking."

A more profitable occupation than breaking stones suggested itself in the weaving trade, and John Bethune apprenticed himself accordingly to a "wabster" in the village of Collessie, working double tides to abridge the period of initiation:—

"To the adoption of this measure there was at the time many inducements. By exerting himself he said he was certain he could earn 2*s.* 6*d.* a-day; my earnings then amounted to very little more than half that sum, and for this reason he wished to teach me his own trade, in which he believed my labours would be better rewarded than that I had formerly followed. From the estate having changed masters, his father, too, had lost his situation as forester; and being now, from the infirmities of approaching age, unable to endure the privations and hardships incident to the life of a common labourer, to provide for his comfort in the evening of his days, was another motive for making the most of everything. With these objects in view, a house adjoining the one in which his father lived, which chanced to be then empty, was taken as a workshop; by the most desperate economy, about 10*l.* had been previously saved to purchase looms, and other articles appropriate to weaving; and at Martinmas 1825 he commenced that business on his own account, with the writer of this sketch as an apprentice. The 10*l.* was fairly expended in procuring a proper supply of utensils."

These efforts were neutralized by the failures, and the consequent distress, of 1825-6. But before the times of want and pinching had come to their worst, we find that the brothers had been gathering material for the pleasures and pursuits of their leisure moments, from

"A student from the College of St. Andrews, who was then struggling hard for his education, and who tried to teach a small school in one of the houses at Lochend. He was an excellent reciter of poetry, and had stored his memory with a number of the best pieces of Scott, Byron, Moore, Campbell, and others. With these he frequently amused and delighted his acquaintances during his leisure hours, a considerable part of which were passed with us."

Not long after, John Bethune began to write; nor from that time did the desire ever abate, or was the pursuit abandoned; though we find the next "event of his uneventful life," was a hard job at clearing out a watercourse!—this, in the dreary month of November. A severe cold, and a long illness followed. A shade better was his appointment as a day labourer in the plantations and gardens of Inchrye. He now, once again,

"Began to look forward with the cheering prospect of rising above poverty, and keeping himself independent by his daily labour: but a new misfortune, which, though it fell not on him, affected him deeply, as falling on a friend, was now impending. On the 11th of November 1829, while the writer of this sketch was employed in blasting rock, a quantity of gunpowder exploded, and throwing him into the air, left him nearly lifeless. * * To his untiring benevolence, and warm affection, upon this occasion, I can bear ample testimony. Patiently did he watch by my bedside till it was supposed I was out of danger; and then to provide for the exigencies of the family, which now depended upon him alone to support, he wrought at his former occupation by day, and took his turn to watch by night, till I could be left with safety. The result of this accident was a heavy expenditure, occasioned by distress, and four months of inability to labour; at the end of which period, from his exertions in behalf of his unfortunate brother, he again found himself in debt."

In despite of all these cares and changes, we find notices of constant fragmentary poetical efforts, which pleasantly occupied him while "employed alone in the plantations of Inchrye:"

"Many of these, from the circumstance of being written in a very minute character, upon such scraps of paper as had come to the house with grocery wares, &c., and from having been long exposed to smoke, dust, and occasional drenchings with rain water, which oozed through the roof, can now scarcely be read. * * By the time he was eighteen, he had determined to surmount the difficulties of orthography; and for this purpose he carried a little work, called 'The Christian Remembrancer,' of which he was then remarkably fond, always in his pocket. From the short poems, of which nearly one-half of the book is composed, he selected one, and when going to and returning from his work, as well as in his journeys at dinner time he was in the habit of conning it over till he had fixed the spelling of every word in his memory; after which he took another, and thus proceeded to the end of the work. * * In the midst of this enthusiasm for a favourite pursuit, it may, perhaps, be supposed that he would, in some measure, neglect his work, and altogether renounce those duties which, as a member of society, he owed to others. The very reverse of this, however, was the case. From his work he was never absent a day, or even an hour, when the weather admitted of going abroad; and if at any time he was inclined to fret, it was when kept at home by rain or deep snow. I think I may also affirm, without fear of contradiction, that there scarcely ever was a man who gave his time

or his assistance to his poorer fellow creatures more willingly than he did. Whatever he may have accomplished, in another way, it was done solely by keeping one object steadily in view, and devoting to it the whole of those hours which others devote to amusement, idle conversation, and visiting acquaintances."

Already the seeds of disease were laid in his constitution, but these hindered him not; and besides being studious, he was charitable, had time to spare for his poor neighbours, and gave—

"A large share of assistance, for several years, in cultivating the gardens of three widows. From the month of March, till the gardening season was over, it was his custom to work from five in the morning till it was time to go abroad, putting such crops as we required ourselves into the ground. When he returned from the labours of the day at six in the evening, he despatched a hasty supper, went to the place where his assistance was expected, and wrought while daylight lasted, or, when the season was more advanced, till ten at night. Widow with him was a sacred name; he had read in his Bible the denunciations of wrath against those who oppressed or troubled them, and the constant injunctions to treat them with kindness and sympathy; and in whatever light others might regard them, he never could think of allowing any personal consideration to stand between him and those services, upon which he considered them as having a just claim from the Word of God. So severe, however, were the labours which he imposed upon himself in this way, that, as the Spring advanced, I have frequently heard him say, 'I am almost scared, man, to think that the yard-season is coming on again.'"

"As an evidence of his industry, and a proof that the 'miserable earnings,' as he termed them, were not squandered upon idle indulgencies, it may be also mentioned, that from them, previous to November 1832, about 14*l.* had been again saved. In the spring of 1830, the reader will recollect that he was rather in debt; little more than two years had passed since then: and when it is known that his earnings seldom exceeded 19*l.* in any year—that, besides himself, he had at least one of his parents to support—that he was in the habit of giving considerable sums in charity, and, perhaps, still more for books—some idea of his personal expenditure may be formed. This could not possibly exceed 7*l.* per annum, food, clothing, and everything included.—Having thus mentioned his little savings, I hope the reader will pardon me for stating the manner in which they were expended. On the 8th of November 1832, the writer of this sketch was once more subjected to the effects of gunpowder, by an accident in a quarry; and before he was able to resume his work, the last farthing of the 14*l.* was gone, and the author of the following poems, and the narrator of his story, were left to begin the world again, with only the clothes on their backs; and these, having already seen severe service, promised soon to leave them. While I would apologize to the reader for troubling him with these particulars, I must confess that it gives me a melancholy pleasure to be able to bring them forward as a proof of the never-failing kindness, disinterested benevolence, and unshrinking and unconquerable perseverance of one so little known."

"He was now in his nineteenth year; and by this time he had begun to carry a book, with a slip of paper and a pencil, constantly in his pocket; and if, in the course of his solitary labours by day, a good idea occurred, he sometimes took such notes of it as would enable him to recall it in the evening. * * The house which we inhabited was long and narrow, with a small vacant space at the farther end of it, lighted by a single pane of glass; and to it, on the summer evenings, when he had the advantage of daylight till it was almost ten o'clock, he sometimes retired with his papers. On one of these evenings I had taken sanctuary in this quarter before he came home. The sun shone cheerfully in at the little window, giving an air of warmth to the place, and making visible a long level streak of its dim smoky atmosphere. When he arrived, with his writing materials in his hand, he leaned upon the chest where my papers where lying, and said, 'If you would only stop for a few minutes, man, I would let you hear my last production.' He then read, with a low musical voice, the following lines:—

Hymns of the Churchyard.

Ah, me! this is a sad and silent city;
Let me walk softly o'er it, and survey
Its grassy streets, with melancholy pity!
Where are its children? where their gleesome play?
Alas! their cradled rest is cold and deep,
And slimy worms watch o'er them as they sleep!

This is pale beauty's bourn: but where the beautiful
Whom I have seen come forth at evening hours,
Leading their aged friends, with feelings dutiful,
Amid the wreaths of spring to gather flowers?
Alas! no flowers are here, but flowers of death;
And those who once were sweetest sleep beneath.

This is a populous place: but where the bustling—
The crowded buyers of the noisy mart—
The lookers on—the showy garments rustling—
The money-changers—and the men of art?
Business, alas! hath stopp'd in mid career,
And none are anxious to resume it here.

This is the home of grandeur: where are they—
The rich, the great, the glorious, and the wise?
Where are the trappings of the proud, the gay—
The gaudy guise of human butterflies!
Alas! all lowly lies each lofty brow,
And the green sod dizens their beauty now.

This is a place of refuge and repose:
Where are the poor—the old—the weary wight—
The scorn'd—the humble—and the man of woes—
Who wept for morn, and sigh'd again for night?
Their sighs at last have ceased, and here they sleep,
Beside their scorners, and forget they weep.

This is a place of gloom: where are the gloomy?
The gloomy are not citizens of death,
Approach and look: where the long grass is plumy,
See them above! they are not found beneath—
For these low denizens with artful wiles,
Nature, in flowers, contrives her mimic smiles.

This is a place of sorrow: friends have met,
And mingled tears o'er those who answer'd not:
And where are they whose eyelids then were wet?
Alas! their griefs, their tears are all forgot;
They, too, are landed in this silent city,
Where there is neither love, nor tears, nor pity.

This is a place of fear: the firmest eye
Hath quail'd to see its shadowy dreariness;
But Christian hope, and heavenly prospects high,
And earthly cares, and nature's weariness,
Have made the timid pilgrim cease to fear,
And long to end his painful journey here.

"Of these, the first verse rose spontaneously while walking in the churchyard during the interval of public worship, and the others had been added on the Monday morning."

"Up to the latter part of 1835, the whole of his writing had been prosecuted as stealthily as if it had been a crime punishable by law. There being but one apartment in the house, it was his custom to write by the fire, with an old copy-book, upon which his paper lay, resting on his knee, and this, through life, was his only writing-desk. On the table, which was within reach, an old newspaper was kept constantly lying, and as soon as the footsteps of any one were heard approaching the door, copy-book, paper, pens, and inkstand, were thrust under this covering, and before the visiter came in, he had in general a book in his hand, and appeared to have been reading. * * From the constant care which was necessary to avoid being detected, and the frequent interruptions to which it subjected him, the mode of proceeding just noticed was found to be highly disagreeable; and he now wished to have a separate apartment to which he could retire with his papers. This had been a long cherished idea, and with a view to its accomplishment, a larger window than that formerly noticed had been fitted into the wall at the farther end of the house. A fire-place was now wanted; and to supply this deficiency, we commenced operations about the 1st of November. After nearly a week of hard labour in the evenings, the work was finished. Though it was then almost midnight, a fire was put into the grate to try how it would vent; but from the circumstance of the chimney-top being considerably lower than the ridge, to his utter disappointment, the smoke and flame, instead of going upward, issued from between the bars! On the following evening the whole was demolished; and with no better materials than three old paling stakes for jambs and lintel, two round poles, which were to serve as supports between these and the roof, some ropes made of straw, and a quantity of mud scraped from the highway, we commenced our operations in a quarter where they were more likely to be successful. When the whole was finished, it looked neat when contrasted with the rest of the house; and this he considered a greater triumph of genius than anything in the performance of which he had hitherto been engaged. For one evening he was allowed to enjoy himself over a fire, the smoke of which was fairly carried off by a vent which he had assisted to construct; there was still much to do in the way of covering the apartment, so as to conceal the smoky rafters overhead: but he already looked forward to long evenings of uninterrupted literary enjoyment, and a winter of unprecedented comfort, when, on the following day, he was engaged to go to Inchrye as overseer, and thus the whole of the labour which he had previously bestowed on the old house at Lochend was in vain."

"Mr. Y——, the late overseer, had died in the month of August preceding; as on the former occasion, he had continued to manage the whole concern between that time and Martinmas; and though he had taken no decided step to procure the situation for himself, and had no expectations of obtaining it, he had been strongly recommended by some friends, and thus his employers had thought proper to promote him to the place of a master, where he had formerly been only a servant. His income was now 26*l.* yearly, with fodder for a cow, which was a very considerable improvement upon his previous earnings. * * An assistant being now in request, I accompanied him in that capacity; and on the evening of the 11th of November 1835, we went thither, taking bed-clothes, and such other articles as we thought we should require, with us on a wheel-barrow.—Being the sole occupants of a solitary house, the new situation seemed for a time to be even better adapted for evening studies than that he had left, and he did not fail to improve his opportunities. But a number of repairs and alterations being required on the estate, the proprietors wished a written report as to the means to be employed, and the most economical method of effecting them; and as he now considered his powers, both of body and mind, engaged in the service of a master, shortly after entering upon his new labours he gave up literature entirely, and devoted the whole of his time during the evenings to this single object."

"I have no intention of troubling the reader with the mere routine of his daily labours, farther than may be necessary to show what may be accomplished by industry, without the adventitious aids of education, and the manner in which he endeavoured to discharge the duty he owed to his employers. In the spring there was a great amount of labour to perform in enclosing grass fields, which were to be let for pasture, while at this season the hot-houses would have required nearly the whole of his attention. That no expense might be incurred which he could possibly save, he undertook a large share of the new fences himself: at these he wrought diligently during the usual working hours; and that the hot-houses might not be neglected, his mornings and evenings, as early and as late as daylight would serve, were devoted to arranging the clusters, and tying down the young shoots of the vines—his father attending to the temperature while he was absent. With the rigid attention which he bestowed on them, things seemed to prosper: the enclosing of the fields had been completed in good time, a luxuriant crop of grapes was advancing to maturity; and his hopes of being able to benefit his employers by his industry, and of being benefited himself by his improved income, were high; when, some time about the end of June, the estate was sold, and the new proprietor almost immediately intimated that he would not require his services beyond the year for which he was engaged. That portion of his history which intervenes between this and Martinmas, I pass over in silence."

"On the evening of the 10th of November, after it was dark, I assisted him in removing his bed-clothes, &c. on a wheel-barrow. When he had got some way on the road, he said, that 'whatever we might have left behind us, he did not think any one could accuse us of having brought more from Inchrye than we had taken thither;' and it was with feelings of satisfaction to which for months he had been a stranger, that he once more took his accustomed seat by the fire in his former home. It was not in his manner to stand upon punctilios: whatever was useful, and could be honestly come by, was, in his estimation, honourable; and instead of vainly striving to maintain a factitious rank in society, he at once commenced work as a common labourer on the public roads. The preparations which had been broken off

on the previous year were resumed, and in a few evenings more he had the satisfaction of taking his seat by a cheerful fire in the long-contemplated little sanctuary at the farther end of the house."

We make no apology for throwing together these traits and incidents. Small in amount though they seem, they were of a life's importance to a human being of no mean gifts and acquirements. It was on one of these winter evenings that he read in a newspaper an account of a series of lectures on Political Economy about to be delivered in one of the provincial towns:—

"The subject attracted his attention; and, after laying down the paper, and pondering over it for a few minutes, 'Do you see, man,' he said, 'I think I have now hit upon a most important subject, which, hitherto, no writer appears to have taken up.' He then proceeded to explain his meaning, by saying that 'it was neither Political Economy, nor Rural Economy, nor Domestic Economy, to which he alluded, but that sort of economy which we had ourselves practised; and which, if it were adopted by others, might enable a greater number of people to live independently on their own earnings, than had as yet thought of doing so.' This was the first hint of Lectures on Practical Economy; and it formed the subject of conversation for two or three succeeding evenings. It was considered that we had ourselves frequently attempted to relieve beggars, and others who were in distress, to the very uttermost of our limited abilities, without producing any palpable effect; and if we could succeed in teaching only a few how to avoid bringing themselves into embarrassed and dependent circumstances, that it would be even more patriotic than trying to relieve them after they had become the victims of poverty and misery. The thing, moreover, might be rendered subservient to our own interest: we might deliver a series of lectures upon this subject in the whole of the towns and villages around, selling admission tickets like other lecturers—and, when the thing had acquired popularity in this way, sell the copyright to a publisher. Such was the picture which presented itself to his glowing imagination; and such, it may be added, are the day-dreams with which mortals too often deceive themselves!—To point out, in a few commonplace observations, the propriety of saving a little money when unencumbered with a family, and the comfort and ease of mind which such an acquisition might be expected to confer, together with the most likely means for obtaining it, would have been an easy task. But then to convince multitudes that the prosperity of the country, as well as the comfort of individuals, depended in a great measure upon every one producing, or saving something, over and above what he consumed, was a different matter. * * To those who are curious in literary matters, it may not perhaps be uninteresting to know, that these lectures were at first written upon brown paper bags ripped open, shreds of paper which had come to the house with tea, sugar, tobacco, &c., in short, everything which would carry ink, while the writers had no better writing-desk than their knees."

But we cannot further follow the dreary tale of his fruitless efforts to bring before the public the results of his literary exertions—the plans taken, and abandoned in silence, though not in despair. One passage more, however, we must have from the events of the year 1837:—

"What affected him most, was the circumstance of his mother having become warmly attached to the hut in which her boys had grown up to men, and the locks of her husband had been bleached by time to an almost snowy whiteness; and for her sake he too could have been contented to linger there, though he could not bring himself to what he considered the degrading alternative of humbly suing for leave to do so. He did not suppose, however, that these feelings would have had much weight with others; and thus he deemed it prudent to be silently and assiduously endeavouring to provide against the worst, whether it should happen or not. He saw that his parents, from age and infirmity, would be ill able to endure the bustle and fatigue of removing at every term, as is frequently the case with poor people in the country, who have nothing but the caprice of landlords to trust to; and for this reason he, as well as the narrator of his story, was anxious to have some asylum for them, to which these vicissitudes would not reach. We had again saved a small sum of money, and after many deliberations, it was at last resolved to venture upon the building of a house.—Having fixed upon the site, and settled as to the feu-duty to be paid for the ground, our next business was to provide as many stones as we thought would be required. This being accomplished, on the 26th of July 1837, with the aid of one mason whom we had engaged to work along with us, we laid the foundation of our future dwelling;—and had it been known to the world that we proposed to finish a house thirty-six feet in length, and twenty in breadth, without asking or taking any assistance except such as we could pay for at the ordinary rate, and with no more wealth than two bolls of oatmeal, to serve as summer provision, the thews and sinews of two human beings, and about 30*l.* in money, reflecting individuals would have probably pronounced us fit for Bedlam: yet such was the case. In less than a week, the mason was called away to another job, but we still persevered. The drudgery which the poor author of the following poems now underwent, was such, that few, perhaps, would have cared for encountering it. He left home every morning before five o'clock, travelled three miles, commenced work immediately, and wrought till nearly half-past seven in the evening, with no more rest than was absolutely necessary to swallow his breakfast and dinner. The last of these, indeed, which consisted exclusively of bread, he frequently ate from his pocket, working the whole of the time. He had then to travel three miles back to his home; and, after having been thus engaged in hard labour and travelling for nearly fifteen hours, it may be believed that he was sufficiently tired before he reached it—yet day after day the same process was repeated, except during those short intervals when the mason wrought along with him, and then he dropped work at the usual time. Had it not been for a vision of the future which was now before him, it is probable that even he might have shrunk from this dreary task. But, in imagination, he already saw the house finished, the garden enclosed, with the crops put into the ground; and his father, now venerable from age, walking through it on a fine summer day, or, if he wished for exercise, employed with a hoe in the little enclosure which he would then be able to call his own. With such illusions—for, as Providence had decreed, they deserved no other name—we used to cheer our journey homeward; and to his warm heart they would have been a sufficient inducement to encounter still greater difficulties than those with which he had to contend. More stones having been provided than were necessary, the house was raised to two storeys. On the 9th of September, the walls were finished; and before the 30th of the same month, the roof was on—an earthen floor laid—the lower flat plastered—part of the partitions built—and doors and windows provided, with very little assistance from tradesmen. With the exception of the carriage of three cart-loads of lime, everything had been paid ready money. But by this time the last farthing of the 30*l.* was expended—the stock of provisions was completely exhausted—and the author of the following pages was glad to engage in such work as he could find, to procure the necessaries of life for himself and friends, and provide a little money to defray the expense of removing, which had now become inevitable.—On the 9th of November 1837, he came to that habitation at the building of which he had toiled so arduously; and when he heard his father say, 'Dear me, John, man, I am perfectly surprised to see that great house you have reared up for us,' it is probable that he considered himself overpaid for all his labours."

The rest of the record is painful: after unwearied attempts, the Bethunes at last got a literary hearing. Prospects of periodical engagement, though small in gain, began to open before them; and the publication of the volume already adverted to, was compassed, not without profitable issue. But early in the past year, the maladies, exasperated by a laborious life, had prostrated John Bethune, and after wasting away for several months, the dutiful son and affectionate brother was released, on the 1st of September 1839.

We have given an abstract of this touching page of biography to little purpose, if some interest has not been excited for productions originating under such painful circumstances. The following are specimens of John Bethune's powers:—

Address to Time—August 1836.

Gray monarch of decay!
Stern conqueror of kings!
Beneath whose all unbounded sway,
The mightiest nations melt away,
And are forgotten things!
Oh! spare but one poor gift to me,
And I resign the rest to thee!

If aught of manly grace,
Or youthful bloom be mine,
Take from thy subject's form and face,
Each faintly marked and fading trace,
Stern spoiler, they are thine;
But dip not thy relentless dart
In the deep fountain of my heart!

Take health, as thou before
Hast taken from my frame;
Take all the little treasured store,
Which memory holds, of hard-earn'd lore,
For these are thine to claim;
But leave me still the power to scan
Kindly the woes of suffering man!

If tyranny must sting
My soul to sternness here,
And from my heart, by torture, wring
Those gentle sympathies, which spring
Where man to man is dear;
Then bait me with the sons of pride—
By them be all my firmness tried!

But ne'er by guile or woe,
That tender organ tear,
Which o'er the weak—the fall'n—the low—
Vibrates with sympathetic glow—
Those slender springlets spare;
And if denied the means to heal,
Still let me have the power to feel!

The Land of Beauty.

(Inscribed in an Album, March 1837).

A lone and melancholy spirit,
To this melodious store
Of treasured memories, would add
One faint memorial more.

'Midst offerings of the beautiful,
Where beauty's eyes may beam,
A stranger would insert his own,
Though that were but a dream.

Not his the moralizing strain,
Not his the serious lay
Which warns the young how soon the charms
Of youth must pass away.

He never saw a rose-bud die,
Nor heard a yellow leaf
Fall, rustling, from the autumn groves
Without a shade of grief;

And ill, I ween, his heart could bear
T' anticipate the time
When youth and beauty, withering,
Must mourn their fleeting prime;

And therefore doth his pensive soul
A joyful solace seek
In visions of that happy land
Where youth is on each cheek;

For there no flower is philomote,
And there no leaf is sere,
And there no autumns blight the bloom
Of an eternal year.

He sees the smiles of spirits pure,
Like sunny waters, play
On faces whose transcendant charms
Can never know decay.

He sees, with joy, seraphic eyes
In liquid lustre shine,
And gladly knows no burning tear
Can dim their beam benign.

He hears the hallow'd harmony
Of rapturous songs arise,
From lips whose every breath is tuned
To anthems of the skies.

He longs to mingle with the blest—
In that celestial Land,
To hold communion chaste and high
With beauty's holiest band;

And he would lure the lovely here,
The young—the good—the fair,
To veil their evanescent charms,
And seek for glory there;

For in that Land, where beauty blooms,
Alone may beauty be
From withering cares, and blighting time,
And sin and sorrow free.

We cannot close this article without observing, that the manner in which the subject is treated, recommends the survivor as strongly as it does honour to the deceased. In patience, modesty,

talent, and resolution, A. Bethune is a worthy brother of the good man so deeply but unostentatiously lamented.

OUR LIBRARY TABLE.

Wilson on the Israelitish Origin of the Modern Nations of Europe.—Archbishop Sharpe used to say, that conjectural interpretation of prophecy either found a man mad or left him so. The remark is well exemplified in this volume, which is certainly a very choice specimen of raving. It purports to prove that the principal European nations are descended from the ten tribes of Israel, and supports the theory by lexical analogies, compared with which Swift's derivation is convincing logic.

Mr. Tuckfield's Letters to a Clergyman.—The object of these letters is to point out the best means of employing charitable funds for the religious and moral education of the lower orders. They are written in a good spirit, and the plans they suggest are pre-eminently practical.

Experimental Observations on the Developement and Growth of Salmon Fry, from the exclusion of the Ova to the Age of Two Years, by John Shaw.—The distinctions existing between the young of the various British species of the genus Salmo having occasioned considerable discussion amongst Ichthyologists, the author of the present paper was induced to institute a series of experiments, with a view to prove that the fish commonly called the parr is the young of the salmon. This he has, apparently, succeeded in establishing, first, by observing that young parrs, possessing the perpendicular bars and other characters of that fish, on being kept a certain time, attain the silvery scales of the salmon, with which their bars become concealed; and, secondly, by rearing parrs from ova deposited by full-grown salmon. The various plans adopted for fully determining the latter fact are detailed at length; and the favourable situation in which the author is placed seems to have afforded him every facility for setting the question at rest. The author describes and figures the fish in various stages of growth; and its appearance on its first exclusion is very remarkable, being furnished with a large vitelline, conical, bag-like appendage, which adheres by its base to the abdomen, and which disappears in about seven weeks from the birth of the fish.

Dr. Alison on the Scottish system of managing the Poor.—The question of a Poor Law for Scotland was the principal subject of discussion in the Statistical Section of the British Association during its recent meeting at Glasgow; and a reference to our reports will enable the reader to appreciate the system advocated by Dr. Alison on the one hand, and the Rev. Dr. Chalmers on the other. The substance of the pamphlet before us was embodied in Dr. Alison's communications to the Section, and we need say no more here than declare his facts to be well arranged, and his inferences to be deduced apparently with caution and candour.

Schoberl's Guide to Greenwich.—This book contains a description of the localities of Greenwich, and some notices of their history. We regret to find the author repeating the vulgar calumny, that "there is an inherent propensity in the lower orders of the English to destroy objects of art," &c. Wherever the old exclusive spirit has been relaxed, experience has shown the direct contrary of this to be true.

A Journey round my Room.—This trifle of Comte de Maistre's was scarcely worth translating, especially as a great part of it is offensive to English taste and delicacy. The version is spirited and faithful—so much so, that we wish the translator had bestowed his labours on some more meritorious production.

List of New Books.—Klattowsky's German Manual of Self-Tuition, Parts II. and III., 12mo. 4*s.* swd.—Weyman's Sequel to Melodia Sacra, 4to. 10*s.* hf-bd.—The Yorkshire Family Magazine, Vol. I. 18mo. 4*s.* 6*d.* cl. gilt.—Combes's Moral Philosophy, or Duties of Man, 12mo. 7*s.* 6*d.* boards.—Howitt's Visits to Remarkable Places, 8vo. 21*s.* cl.—Bainbridge's Fly Fisher's Guide, 4th edit. 12mo. 10*s.* 6*d.* cl.—Adams's Gem of the Peak, 12mo. 4*s.* swd.—Heads of the People, Second Series, 8vo. 14*s.* cl.—Cawac's Art of Oil Painting.

[ADVERTISEMENT.]—(From the *Times* of October 15.)—FISHER'S HISTORIC ILLUSTRATIONS OF THE BIBLE.—"The plates are clear, brilliant, and true, and the letter-press explanatory both of the picture and the portion of Scripture it illustrates. The work is, in fact, a Commentary on the Holy Writings, comprehensible by all capacities, calculated to assist the biblical student, and to allure youthful readers to prosecute the most important of all studies with ardour and enthusiasm.—PROTESTANTS have neglected the assistance of the fine arts in the cause of religion, from a notion that the embellishments of sculpture and painting beget superstition at the expense of religion:—that notion is now at an end, and the religious public are aware that Christianity can receive no injury from its truths being illustrated by the progress of the arts.—There is one circumstance in the arrangement of *these* illustrations which is judicious, and will remove the scruples of the most fastidious—*corporeal* expression of spiritual beings is carefully avoided, as well as everything that appeared to approach the great Author of our being with familiarity."

[ADVERTISEMENT.]—SIR WALTER SCOTT'S WORKS and LIFE PROFUSELY ILLUSTRATED.—The early attention of booksellers and the public is particularly called to the following works; a very limited number only can be made up:—The NOVELS, TALES, and ROMANCES, POEMS, and MISCELLANEOUS WORKS, with LIFE by Lockhart, illustrated by upwards of 420 early impressions (partly proofs), from engravings by the most eminent artists, 98 vols. cloth elegant, price 24*l.* 10*s.*; or in separate portions, viz.—Novels, Tales, and Romances, illustrated by 286 proofs or early impressions, 48 vols. 12*l.*—Poetical Works, illustrated by 60 engravings, 12 vols. cloth lettered, 3*l.*—Miscellaneous Prose Works, 56 engravings, 28 vols., 7*l.*—Lockhart's Life of Scott, 20 plates, 10 vols. cloth lettered, 2*l.* 10*s.*—The above may be had, bound in cloth or any other style of binding, either with or without the additional illustrations, at proportionate prices, of H. Washbourne, 48, Salisbury Square.

TENTH MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

[*From our own Correspondents.*]

TUESDAY, SEPTEMBER 22.

SECTION A.—MATHEMATICAL AND PHYSICAL SCIENCE.

Prof. Forbes in the chair.

Report of the Committee, (Sir J. Herschel, Mr. Whewell, Mr. Peacock, and Prof. Lloyd,) appointed to draw up plans of scientific co-operation relating to the subject of Terrestrial Magnetism.

In consequence of the measures adopted, as detailed in the last Report of this Committee (*Ath.* No. 620), a very extensive system of magnetical corresponding observations has been organized, embracing between thirty and forty stations in various and remote parts of the globe, provided with magnetometers and every requisite instrument, and with observers carefully selected, and competent to carry out, at most, if not all the stations, a complete series of two-hourly observations, day and night, during the whole period of their remaining in activity, together with monthly term observations, at intervals of two minutes and a half. Of these observatories, that at Dublin, placed under the immediate superintendence of Prof. Lloyd, has been equipped and provided for by the praiseworthy liberality and public spirit of the University of that metropolis—those at Toronto, the Cape, St. Helena, and Van Diemen's Land, as also the two itinerant observatories of the Antarctic Expedition, by the British government—those of Madras, Simla, Sincapore, and Aden, by the Hon. East India Company;—to which are to be added ten stations in European and Asiatic Russia, and one at Pekin, established by Russia—two by Austria, at Prague and Milan—two by the Universities of Philadelphia and Cambridge, in the United States—one by the French Government, at Algiers—one by the Prussian, at Breslau—one by the Bavarian, at Munich—one by the Spanish, at Cadiz—one by the Belgian, at Brussels—one by the Pasha of Egypt, at Cairo—and one by the Rajah of Travancore, at Trevandrum, in India. In addition to this list, it has recently also been determined (at the instance of the Royal Society) by the British government to provide for the performance of a series of corresponding observations, both magnetic and meteorological, at the Royal Observatory at Greenwich, under the able superintendence of the Astronomer Royal. At Hammerfest, also, in Norway, negotiations have been for some time carrying on for establishing an observatory of a similar description, in which M. Hansteen has taken an especial interest. A great number of magnetic and other instruments available for this service, it appears, have been left at Kaafiord by M. Gaymard, acting for the "Commission Scientifique du Nord," under the directions of the French Ministry of the Marine—all which instruments, through the efficient intervention of M. Arago, it is understood, will be placed at the disposal of the observer or observers who may be appointed to conduct the observations. To complete the establishment, however, certain instruments, as well as registry-books, &c. are still requisite. The Council of the Royal Society have undertaken to supply these from the Wollaston Donation Fund.—As regards the magnetic observatory at Breslau, under the direction of M. Boguslawski, your Committee have to report, that in order to secure the establishment of that station, and to place it on an equal footing with the rest, certain instruments, &c. required to be provided, for which no funds existed or could be made available on the spot, viz.—a bifilar and a vertical-force magnetometer, with the requisite reading telescopes, and a set of registry-books.—As, owing to the actual circumstances of that observatory, there appeared no prospect of these requisites being otherwise supplied—as the station appeared to your Committee a desirable one, and as M. Boguslawski was willing and desirous to lend his aid to this great combined operation, by taking on himself the laborious duty of conducting the observations, your Committee conceived, that although possibly transgressing, in some degree, the strict wording of their powers, they were only acting up to their spirit in devoting a portion (185*l.*) of the funds placed at their disposal to supplying them, at the expense of the Association. Unwilling to claim any privilege or establish any precedent for the smallest deviation from the strict literal interpretation of a money grant, your Committee suggest to the meeting the propriety of ratifying, by an express act of recognition, their application of the above-mentioned sum. A letter from M. Boguslawski, dated the 22nd of July, 1840, announces the safe arrival of the instruments and books in question, and the consequent complete state of instrumental equipment of the Breslau observatory, expressing, at the same time, his sincere thanks for the assistance accorded him.—By returns from the several stations authorized by the British government, so far as yet received, it appears, that the observatories at the Cape and St. Helena might be expected to be complete and ready for the reception of the instruments in May. From Van Diemen's Land, no accounts have yet been received. At Toronto, where the greatest delays and difficulties were to be expected and have been experienced, the observatory was so far advanced at the date of Mr. Riddell's last communication, as to leave no doubt of its completion in time for the regular observation of the August term. Meanwhile, in this, as at the other stations, all observations practicable under the actual circumstances of each are made and regularly forwarded; and here your Committee would especially call attention to the extremely remarkable phenomena exhibited at Toronto on the 29th and 30th of May, when, by great good fortune, a most superb aurora appeared at the very time of the term observations—(see table of the terms, Report of Council of R.S., p. 38). The phenomena of this aurora (which was remarkable for the extent and frequency of the *pulsating waves* alluded to in that part of the report above cited (p. 47) relating to this subject) are very minutely and scientifically described by Mr. Riddell. But what renders the occurrence presently interesting, is the fact, that during the whole time of the visible appearance of this aurora on the night from the 29th to the 30th, as well as for some hours previous, while it might be presumed to be in progress, though effaced by daylight, all the three magnetical instruments were thrown into a state of continual and very extraordinary disturbance. In fact, at 6h. 25m. in the morning of the 29th, the disturbance in the magnetic declination during a single minute of time carried the needle over ten minutes of arc; and during the most brilliant part of the evening's display (from 3h. 25m. Gött. m. t. to 4h. 35m.), the disturbances were such as to throw the scales of both the vertical and horizontal force magnetometers out of the field of view, and to produce a total change of declination, amounting to 1° 59′. It should also be remarked, that the greatest and most sudden disturbances were coincident with great bursts of the auroral streamers. The correspondence or want of correspondence of these deviations with the perturbations of the magnetic elements observed in Europe and elsewhere on the same day, cannot fail to prove of great interest. Should it fortunately have happened that Capt. Ross has been able to observe that term at Kerguelen's Land, which is not very far from the antipodes of Toronto, an indication will be afforded whether or not the electric streams

producing the aurora are to be regarded as diverging from one magnetic pole or region, and converging to another.—Your Committee cannot conclude this report, without congratulating the Association and the scientific world in general on the extensive interest inspired, and the vast range of observation consequently embraced by this operation, which, so far as any accounts have hitherto reached them, appears to be going on prosperously in all its parts, and to promise results fully answerable to every expectation of its promoters. Neither would they feel justified in their own eyes, were they to omit expressing their deep and grateful sense of the indefatigable personal exertions of Major Sabine throughout the whole of the progress, both in carrying on a most voluminous correspondence, in ordering, arranging, and dispatching instruments, and facilitating, by constant attention and activity, those innumerable details which are involved in a combination so extensive—a combination which, but for those exertions, your Committee are fully of opinion must have been greatly wanting in that unity of design and co-operation which now so eminently characterizes it.

Signed, on the part of the Committee,
J. F. W. Herschel.

Prof. Forbes remarked on one point that appeared to him important. The magnetic needle was known to be in a constant state of motion, and it was heretofore supposed that these motions were exactly identical as to time all over at least the continent of Europe; but now it appeared, that a test of this having presented itself on the occasion of the unusual disturbance of the needle referred to, they were found not to be exactly synchronal. He then made some observations on the extraordinary auroral disturbances of the needle referred to.—Major Sabine read the following letter from M. von Boguslawski, director of the magnetical observatory at Breslau, received since the meeting had commenced:

Breslau, September 7th, 1840.

My dear Sir,—I have the pleasure to inform you, that during the last magnetic term, viz. on the 28th and 29th of August, I have made observations with the two magnetic instruments provided by the British Association. Notwithstanding the Michaelmas term of our University has begun, I have succeeded in engaging and instructing a double number of observers, sufficient to place them at the declination magnetometer in the magnetic cabinet, as well as at the horizontal and at the vertical-force magnetometers in the great room of the Observatory. The observations hitherto made can, however, only be considered as observations of the magnetic variations, because there are several masses of iron fixed in the buildings. The prospect of obtaining a separate magnetic observatory being still distant, I feel myself highly indebted to Prof. Lloyd for the assistance his paper 'On the mutual Action of Permanent Magnets,' &c. has afforded me. By these instructions, I have succeeded in effecting what at first seemed to be impossible, namely, to place the declination magnetometer, the bifilar instrument, and the vertical force magnetometer, *in the same room of the present magnetic cabinet*, and to put them in equilibrium. How this is to be done by three small fixed subsidiary magnetic bars, I shall hereafter explain to Prof. Lloyd, and, if he agrees with me, all these instruments will be placed in the magnetic cabinet at the next term. However, I shall use for a declination magnetometer the second magnetic bar received with the horizontal-force magnetometer, instead of the present bar of four pounds, in order to obtain small correction-constants. I shall, then, expect with patience the establishment of a proper magnetic observatory, so as to begin to make absolute and daily observations. * * (Signed) Henry von Boguslawski.

Major Edward Sabine.

Major Sabine also presented, at the request of M. Kupffer, director general of the magnetical observatories of Russia, several copies of a report addressed by that gentleman to the Imperial Academy of Sciences at St. Petersburgh, entitled, 'Sur les Observatoires magnétiques fondés par ordre des Gouvernemens d'Angleterre et de Russie sur plusieurs points de la surface terrestre.' In this report, the Russian observatories, acting on the same system of observation, both magnetical and meteorological, as those of England, are enumerated as follows:—

Stations.	Directeurs.
St. Pétersbourg	M. Kupffer, directeur général.
Catherinebourg.	M. Roschkoff } Ingénieurs des mines.
Barnaoul	M. Prange, 1er } Ingénieurs des mines.
Nertchinsk	M. Prange, 2eme } Ingénieurs des mines.
Kazan	M. Simonoff } Directeurs des observatoires
Nikolaïeff	M. Knorre } astronomiques.
Tiflis	M. Philadelphine, Professeur au Gymnase.
Sitka (Côte N.O. de l'Amérique)	MM. Homann et Fwanoff.
Helsingfors (Finland)	M. Nervander, Prof. extraor. à l'Université.
Pekin (Chine) ..	M. Gaschkevitsch { Membre de la mission ecclésiastique.

A la station de Pékin nous aurons, si non autant d'observations que des autres stations, au moins les observations les plus importantes.

In reference to the aurora which had been seen at Toronto, in Upper Canada, on the 29th of May, and to the magnetic perturbations by which its appearance had been accompanied, the Astronomer Royal stated, that the term day of the 29th and 30th of May had also been kept at the Royal Observatory at Greenwich, that an aurora was seen there also on the 29th, and that the disturbances of the declination magnetometer exceeded in amount any which had been observed there on previous occasions. Not having brought the observations with him, he could not state whether their comparison with the curves of the Toronto observatory, which Major Sabine had laid before the Section, would manifest an accordance between the disturbances at the two stations; a point of the highest interest as to the nature and extent of these perturbations. He was happy to inform the Section that her Majesty's Government had sanctioned the establishment of a magnetic observatory at the Royal Observatory at Greenwich. He had for some time had observations made under his superintendence, and had observed some remarkable auroral disturbances of the needle, when the amount of the deflection had, as well as he remembered, exceeded 0°.5. The coincidence of these disturbances had not been exact; at Greenwich, as in America, they had been found to occur earlier than those in places more to the east. One thing in the report had a peculiar interest to him, now that he was about to have a magnetic observatory under his own direction; he alluded to the mode of placing the magnets, so as to produce the least mutual action. The three small correcting magnets he considered to be a very useful hint; these, with Prof. Lloyd's investigation, he conceived left little to be desired on the subject. However, he thought, after all, it would be well to establish tables by actual observation, showing the effect produced on each magnet in all the positions ever assumed by each of the others; which might be accomplished at a small expense of time and trouble compared with its importance.

Dr. Lamont gave an account of the Magnetic Observatory of Munich, stating that the building had been undertaken in April this year, and that the regular series of observations, comprehending both the two-hourly daily observations and the term day observations, was commenced on the 1st of August. The magnetic observatory of Munich differs in two respects from other establishments of the same kind. In the first place, it is not a magnetical house, but a subterranean building, which is situated to the S.W. of the Royal Observatory, at a distance of about 120 feet, and connected with it by a subterranean passage. The depth of the magnetic observatory below the surface of the earth is 13 feet, thus affording the advantage of a temperature nearly equal at all times of the year, and rendering the corrections applied to magnetic observations in order to reduce them to a fixed temperature—corrections which are in general subject to considerable uncertainty—if not unnecessary, at least sufficiently small to be determined with the utmost degree of accuracy. In the second place, the instruments are of greater dimensions than those usually employed in magnetic observatories, and may be considered as sufficient in all respects for the most delicate investigations. The magnetic bars weigh 25lb. each; the theodolite has a circle of 2½ feet diameter, and an achromatic telescope of 3½ inches aperture. It may be remarked, that the horizontal-force instrument differs from the bifilar magnetometer, the power that holds the bar in a direction perpendicular to the magnetic meridian being that of a spiral spring. Besides the instruments fixed, there are portable instruments for making experiments with bars of ½lb, 1lb, 4lb, 10lb, and 25lb.

Prof. Forbes considered the plan of obtaining a uniform temperature excellent. The elimination of changes of temperature from the results he considered would be found highly desirable in other delicate observations as well as in magnetical; thus, in the late attempt to repeat Cavendish's experiments to determine the mean density of the earth, with all the exactness which the modern refinements in observing afforded, he believed Mr. Baily had been obliged to abandon them from the anomalies developed, chiefly, he believed, by changes of temperature.

Dr. Lamont gave a general statement of the system of Meteorological Observations carried on in Bavaria. The Royal Observatory of Munich constitutes the central establishment, and has the superintendence of all meteorological observations made under public authority. There are meteorological observations at Ratisbon, Augsburg, and Hohen-Peissenberg, the latter being situated on the summit of a mountain 3,000 feet above the level of the sea. Besides, meteorological observations are registered partly by members of the Royal Meteorological Society, partly by persons appointed by government, at 260 towns and villages in Bavaria. The observations thus obtained, though not equally complete, some of them being registered only once, some twice, and but a comparatively small number three times a day, will be found extremely valuable for the purposes of meteorology. Hourly observations of the barometer and thermometer have been made at the Royal Observatory of Munich since May 1838, by means of accurate registering instruments, constructed on a new principle. Dr. Lamont, in mentioning this extensive system of observations, referred for the results and further particulars, to the annual publications of the Royal Observatory of Munich, and concluded by remarking that the great object of meteorology was to find the causes from which the changes in the atmosphere arise—to trace the propagation of these changes from one place to another, and the modifications they undergo on their way—to show what relation exists between the state of the atmosphere at different parts of the globe, and how the changes at one place depend upon or are connected with simultaneous or preceding changes at another. This, he said, can only be attained by combining observations made in different countries after a general and uniform system. In mentioning the extensive observations carried on in Bavaria, it was his intention to show how far a general system was likely to be supported in that part of Germany, and to express the hope that such a system will be introduced at no distant period, perhaps by the same Association by whose exertions a similar system of magnetic observations has now so successfully been carried into effect.

'On the Principles of Electro-Magnetical Machines,' by Prof. Jacobi, of St. Petersburgh.

"I have the honour to present to the British Association an historical sketch of the laws which regulate the action of Electro-magnetic Machines, laws which will enable us to determine in a precise manner the important question, of the application of this remarkable force as a moving power. Since the commencement of my labours, which had partly a purely practical tendency, I proposed to myself to fill up as much as possible the blank which still remained in our knowledge of electro-magnetism. With the assistance of M. Lenz, I prosecuted the labours, which were the more arduous as they had but few precedents in the direction which I considered it necessary to follow, and we began to examine carefully the laws of electro-magnets. The report, which contains the results of our researches, was read in June 1838, before the Academy of Sciences at St. Petersburgh. I take the liberty of repeating here very briefly, the contents of this first report. The problem which we sought to determine may be stated as follows: If a nucleus of malleable iron and a voltaic battery of a certain surface is given, into what number of elements should this surface be divided? what should be the thickness of the wire of the helix which surrounds the nucleus? and, lastly, what number of turns should this helix have, in order to produce the greatest amount of magnetism? I will not dilate here upon the manner in which we have proceeded, or upon the degree of certainty which belongs to the laws established according to our observations. I take the liberty of appending to this statement the report in question, and will proceed to explain the particular laws: 1st. The amount of magnetism engendered in malleable iron by galvanic currents, is in proportion to the force of those currents. 2ndly. The thickness of the wire twisted into a helix, and surrounding a rod of iron, is absolutely of no consequence, provided that the helix have the same number of turns, and the current be of the same force. This law extends also to the case in which ribbons of copper are employed instead of wire. Nevertheless I must notice, that in order to obtain a current of equal force, it is necessary to employ a voltaic apparatus of greater force, if small wires which offer a greater

resistance are employed. 3rdly. If the current remain the same, the influence which the diameter of the helix exercises may be neglected in the majority of practical cases. 4thly. The total action of the electro-magnetic helix upon the rod of iron, is equal to the sum of the effects produced by each coil separately. Adopting these laws, and submitting them to calculation according to the formula of M. Ohm, the importance of which formula has but lately begun to be appreciated by some British philosophers, we have established the formula which contains all the particular conditions required to obtain the maximum amount of magnetism, which may be expressed in the following extremely simple manner, viz. *the maximum of magnetism is always obtained when the total resistance of the conducting wire, which forms the helix, is equal to the total resistance of the pile.* On referring to the remarkable law of the definite action of the galvanic current, established by Mr. Faraday, it is found that the magnetism of malleable iron divided by the consumption of zinc,—a quantity which we have called economic effect, is with reference to the maximum of this magnetism, a constant, or an expression into which neither the thickness of the wire nor the number of the elements into which the total given surface of the battery is divided enters, but only the total thickness of the envelope.

"Having finished these first researches, and having obtained these results, which were highly satisfactory, not only for their simplicity, but also for their practical value, we set about extending our inquiries to iron rods of different dimensions. Is there, it may be asked, any specific effect produced by the length or thickness of the nucleus? or does the degree of magnetism solely depend upon the construction of the helix, and the force of the current? The solution of this new problem presents a greater difficulty than the problem which we had succeeded in completely solving. Now, we are obliged to take iron rods of different dimensions, and, consequently, in all probability of different qualities. Similar conditions with reference to the action of the electro-magnetic helices are likewise difficult to obtain; and we soon perceived that these circumstances rendered it impossible to attain so close an accordance, as that which we had obtained in our former observations. Although these experiments were made two years ago, the results have not yet been published, because, being occupied with other labours, we have not been able to find the necessary time for their reduction and arrangement, and for the requisite calculations. Nevertheless I take the liberty of presenting to the Section some results, which are not devoid of interest, and which are intimately connected with the question of electro-magnetic machines. We submitted nine cylinders of malleable iron, each eight inches in length, and of different diameters, from three inches down to one-third of an inch, to the action of a voltaic current of the same force in each case, and we obtained the amount of magnetic force represented in the following table.

Diameter of the rods.	Magnetism observed.	Magnetism calculated.
3	447	442
2½	378	376
2	308	310
1½	246	244
1	175	178
⅞	158	156
¾	142	135
⅝	112	113
½	87	91

"This calculation has been made according to the formula $m = 131.75\ d + 46.75$, in which the constants have been obtained by the method of the least squares. The differences between calculation and observation, are not so large that they cannot be attributed to the inevitable errors of observation, and to circumstances inherent in the qualities of iron, &c. A similar agreement is found between other observations, which we shall describe in the report itself. I think, therefore, we may admit the following law, namely, that the *amount of magnetism received by different iron rods of the same length, and submitted to the influence of a current of the same force, is proportional to the diameter of the rods.* I must remark, that the constant which we have added in the formula depends upon the magnetic influence which the helix exercises, independently of the nucleus of iron which it incloses. The practical consequences which may be deduced from this remarkable law are of considerable importance. Among these, however, I will at present mention only the following. Having found that the amount of magnetism is proportional to the surface of the malleable iron, and taking into account the quantity of iron employed in the electro-magnets, it is ascertained that it is more advantageous to employ in the construction of electro-magnetic machines, rods of small instead of large dimensions; or rather hollow iron, in accordance with my own experiments of 1837, which are found in 'Taylor's Scientific Memoirs,' vol. ii. &c. I cannot pass over in silence the experiments of Prof. Barlow, who, as is well known, proved a long time before that the induction of the terrestrial magnetism upon malleable iron, depends only upon the surfaces, and is almost independent of the thickness. In order to ascertain the law of electro-magnets of different lengths, M. Lenz and I undertook numerous and laborious observations, which were extended even to rods of thirteen feet in length, and keeping in view at the same time the determination of the particular distribution of magnetism in the rods. Among these observations I shall only refer to such as seem most applicable to electro-magnetic machines, and which have yielded results as simple as unexpected. The following table contains the results of some observations made with rods of the same diameter, but of different lengths, covered with electro-magnetic helices, and influenced by a current of the same force. M being the magnetism of the extremities, and n the number of the coils of the helix, we have $\frac{M}{n} = x$, a formula according to which we may calculate the numbers contained in the third column. The numbers in the fourth column are deduced from a series of other observations, made with the same helix of 960 turns, which did not cover the whole length of the rods, but were collected at the extremities only, where they occupied a space of about two inches in length. The helices being the same in all the observations, it was only necessary to divide the magnetism of the extremities by 960, in order to find the numbers of this column.

Table of Experiments upon the Magnetic Forces of Rods of different lengths.

Length of the Rods.	Number of Coils.	Mean Value of One Coil, if the Helix occupies the whole length.	Mean Value of One Coil, if the Helix occupies only the extremities.
3′	946	7,334	7,560
2′.5	789	6,993	7,264
2	634	7,402	6,871
1.5	474	7,880	7,491
1	315	7,847	7,573
0.5	163	7,766	7,691
		7,537	7,408

"From these numbers, it will be seen that the influence of one coil of the helix is nearly the same for all the rods, and that their length does not exercise any specific influence. It is only in proportion to the number of the turns or revolutions, and to the force of the current, that the rods can acquire a greater or less amount of magnetism. The small rods even appear to have a slight advantage over large rods, since it has been found by experiments that the actual force of rods of three feet, bears to that of rods of half a foot the ratio of seventy-three to seventy-seven. It is also found, that there is a gain of seventy-five to seventy-four when the whole length of the rods is covered, instead of simply collecting the same number of coils around the extremities. The differences between the observations and the simple laws are, as will be judged, quite inconsiderable for practical purposes, and will, in time, I hope, entirely disappear by a complete integration embracing the whole length of the rods, and founded upon the effect of an elementary part of the current. I will now hasten on to the immediate object of my present address. In March 1839, M. Lenz and I presented to the Academy of Sciences at St. Petersburgh, a report, which I shall present to the Association. It contains the result of the experiments by which we have been enabled to establish the remarkable law, *that the attraction of the electro-magnets is proportional to the square of the force of the galvanic current, to the influence of which the rods of iron are submitted.* This law is of the highest practical importance, as it serves for the basis of the whole theory of electro-magnetic machines.

"Before proceeding, I may be permitted to make some remarks concerning an instrument which I laid before the Academy of Sciences, in the commencement of this year. It is destined to regulate the galvanic current, and is of value in many investigations of this kind. During my sojourn in London, Prof. Wheatstone has shown me an instrument, founded on exactly the same principles as mine, and with very inconsiderable modifications and differences. Now, it is quite impossible that he should have had the least notice of my instrument; but as it is probable that its use may be greatly extended, I must add, that while I have only used this instrument for regulating the force of the currents, he has founded upon it a new method of measuring these currents, and of determining the different elements or constants, which enter into the analytical expressions, and on which depends the action of any galvanic combination. It is principally to the measure of the electro-motive force, by those means, that Mr. Wheatstone has directed his attention; and he has shown me, in his unpublished papers, very valuable results which he has obtained by this method.

"While these purely theoretical researches were in progress, I did not fail myself to enter directly upon the question of the practical application of electro-magnetism. Unfortunately, I cannot here give the details either of the experiments which I have made upon a very large scale, or of the machines and apparatus of various kinds which I have constructed. The necessity of multiplying the facts or tangible results—a necessity the more urgent, because the practical applications of this force increased so very rapidly—this necessity, I say, has not allowed me time or leisure to digest and arrange them. I can only here express my readiness to afford any explanation of the details which may be desired. I will, however, particularly notice the satisfactory results of the experiments made last year with a boat of twenty-eight feet in length and seven and a half feet in width, drawing 2½ feet of water, and carrying fourteen individuals, which was propelled upon the Neva at the rate of about three English miles in the hour. The machine, which occupied very little space, was set in motion by a battery of sixty-four pairs of platina plates, each having thirty-six square inches of surface, and charged according to the plan of Mr. Grove, with nitric and diluted sulphuric acid. Although these results may perhaps not satisfy the exaggerated expectations of some persons, it is to be remembered, that in the first year, namely, in 1838, this boat being put in motion by the same machine, and employing 320 pairs of plates, each of thirty-six square inches, and charged with sulphate of copper, only half this velocity was obtained. This enormous battery occupied considerable space, and the manipulation and the management of it was very troublesome. The judicious changes made in the distribution of the rods, in the construction of the commutator, and lastly, in the principles of the voltaic battery, have led to the successful result of the following year, 1839. We have gone thus on the Neva more than once, and during the whole day, partly with and partly against the stream, with a party of twelve or fourteen persons, and with a velocity not much less than that of the first invented steam-boat. I believe that more cannot be expected from a mechanical force, whose existence has only been known since 1834, when I made the first experiment at Königsberg, in Prussia, and only succeeded in lifting a weight of about twenty ounces, by even this electro-magnetic power.

"I must, on the present occasion, confess frankly and without reserve, that hitherto the construction of electro-magnetic machines has been regulated in a great measure by mere trials; that even the machines constructed according to the indisputable laws established with regard to the statical effects of electro-magnets, have been found inefficient, as soon as we came to deal with motion. Being always accustomed to proceed in a legitimate manner, and feeling great regret at the irregular attempts which were being made everywhere, without any scientific foundation, this state of things appeared to me so unsatisfactory, that I could not but direct all my efforts to ascertain clearly the laws of these remarkable machines. I submit the formulæ relative to these laws, which appear to me to recommend themselves as much by their simplicity as by the natural manner in which they develope themselves. Let R represent all the me-

chanical resistances acting upon the machine, and v, the uniform velocity with which it moves: we have for the power or mechanical effect, the expression $T = R\,v$. Let n be the number of the coils of the helix which covers the rods; z, the number of the plates of the battery; B, the total resistance of the galvanic circuit; E, the electro-motive force; k, a coefficient, which depends on the arrangement of the bars, the distance of the poles, and the quality of the iron; we have then for the maximum of the mechanical effect which will be obtained, the expression—

$$\text{I.} \quad T_m = \frac{z^2\,E^2}{4\,Bk}.$$

For the velocity, which corresponds to this maximum,

$$\text{II.} \quad v = \frac{B}{kn^2}.$$

For the resistance acting upon the machine,

$$\text{III.} \quad R = \frac{n^2\,z^2\,E^2}{4\,B^2}.$$

Lastly, for the economic effect, *i. e.* the duty or the mechanical effect divided by the consumption of zinc in a given time,—

$$\text{IV.} \quad O = \frac{E}{2k}.$$

"These formulæ may be expressed in the terms:—

"1st, The maximum of mechanical effect which may be obtained from a machine, is proportional to the square of the number of voltaic elements, multiplied by the square of the electro-motive force, and divided by the total resistance of the voltaic circuit. There enters, moreover, into the formula, a factor, which I have designated k, and which depends upon the quality of the iron, the form and disposition of the rods, and the distance between their extremities. The result is, that with reference to some other investigations, which I have made of voltaic combinations, and under similar conditions, the use of platinum, zinc, the resistance being the same, will produce an effect two or three times greater than the use of copper, zinc.

"2nd, Neither the number of the coils of the helix which covers the rods, nor the diameter or the length of the rods themselves, has any influence upon the maximum of the power. It results, therefore, that neither by adding to the length or diameter of the rods, nor by employing a greater quantity of wire, can the power be increased. There is, however, this remarkable fact, that the number of coils disappears from the formula, simply because the force of the machine is in a direct ratio, and the velocity is in an inverse ratio, to the square of this number. It is thus that the number of coils, the dimensions of the rods, and the other constituent parts of an electro-magnetic machine, should be considered simply as occupying the range of the ordinary mechanisms which serve for the transmission or transformation of the velocity, without increasing the available power. So it would be possible to use, instead of the ordinary wheelwork, rods of greater or less length, or a greater or less quantity of wire, in order to establish between the force and the velocity, the relation which the applications to manufacturing processes may require.

"3rd, The mean attraction of the magnetic rods, or the pressure which the machine can exert, is proportional to the square of the current. This pressure is indicated by the galvanometer, which in this manner performs the function of the manometer of steam-engines.

"4th, The economic effect, *i. e.* the duty or the available power, divided by the consumption of zinc, is a constant quantity, which is expressed most simply by the relation between the electro-motive force and the factor k, which has been previously noticed. I may here repeat, what I stated elsewhere, that by employing platinum instead of copper, the theoretical expenses may be reduced in the proportion of nearly 23 to 14.

"5th, The consumption of zinc, which takes place while the machine is at rest, and does no work at all, is double that which takes place, while it is producing the maximum of power.

"I consider that there will not be much difficulty in determining with sufficient precision the duty of one pound of zinc, by its transformation into the sulphate, in the same manner that in the steam-engine, the duty of one bushel of coal serves as a measure to estimate the effect of different combinations. The future use and application of electro-magnetic machines appears to me quite certain, especially as the mere trials and vague ideas which have hitherto prevailed in the construction of these machines, have now at length yielded to the precise and definite laws which are conformable to the general laws which nature is accustomed to observe with strictness, whenever the question of effects and their causes arises. In viewing on the one hand a chemical effect, and on the other a mechanical effect, the intermediate term scarcely presents itself at first. In the present case, it is magneto-electricity, the admirable discovery of Faraday, which we should consider as the regulating power, or, as it may be styled, the logic of electro-magnetic machines."

Prof. Forbes congratulated the Section on the advance made towards introducing electro-magnetism among our useful moving powers. Here was a boat, twenty feet long, capable of containing fourteen people, propelled by it on the Neva, at the rate of three miles an hour; a more successful result than had for many years been attained in the use of steam for a similar purpose.—A Gentleman asked the power of the engine.—Prof. Jacobi replied, about 1 or 1.5 horse, but the term horse power was itself vague.

'Observations on the Tides in the Harbour of Glasgow, and the velocity of the Tidal Wave, in the estuary of the river Clyde, between Glasgow and Port Glasgow,' by William Bald.

Mr. Bald stated that he had been for a considerable time past engaged in making observations on the rise and fall of the tides in the harbour of Glasgow. The first series of observations was commenced on the 26th of April 1839, and extended to the 1st of October 1839, and contain 158 observations of the rise and fall of the tides. The first portion of these observations were only made during the day, and did not extend to the night tides. These 158 observations assigned the mean rise and fall of tide in the harbour of Glasgow, to be 6ft. 7in. 20d.* The number of tide observations made from the 1st of October 1839 to the 27th August, amounts to more than 1,200. These also had been tabulated and divided into months, but such of the tides as have been much disturbed by floods Mr. Bald had rejected. By reference to the table exhibited for October 1839, the first line stated from the 1st of October to the 7th of October, number of tides 13; mean rise and fall of these 13 tides was stated to be 6 feet 5 inches; the mean low water of these 13 tides below top of South Quay wall in the harbour of Glasgow, was 15ft. 8½in., the mean high water below top of South Quay wall, 9ft. 3½in.; and the mean half-tide level below top of South Quay wall, 12ft. 6in. The table showed the number of tides for new moon, first quarter, full moon, and last quarter; the total number of tides for each month, the mean rise and fall of tide per month, the mean low water below top of South Quay wall, mean high water below top of South Quay wall, and mean half-tide level below top of South Quay wall per month. The mean rise and fall of these 1213 tides assigns an average of 6ft. 8in. 98d.; and the first series of 158 tides assign a mean rise and fall of 6ft. 7in. 20d. It also appeared from other tables and observations, that the tidal wave runs from Port Glasgow to Bowling, at a rate or velocity of 14.56 miles per hour; from Bowling Bay to Clyde Bank, at a rate of only 6.82 miles per hour; but from Clyde Bank to Glasgow Harbour at a rate of 10.85 miles per hour. The diminished velocity between Bowling Bay and Clyde Bank arises from the channel of the river being more crooked in that part than any other portion, thereby showing the great necessity of straightening and improving it.

Prof. Kelland 'On the Conduction of Heat.'

The author's object in bringing forward this subject at the present time, he explained to be, to point out the state of our experimental knowledge of the transmission of heat, and to exhibit its total inadequacy to serve as the test of any precise and accurate theory. The following is a brief sketch of the history of the subject. Little had been done before the time of Lambert, who, in 1755, solved one of the most simple problems. Afterwards appeared the writings of Euler. But it was left for Fourier, at the commencement of the present century, to exhibit a theory having about it the characters of truth, adequacy, and extension. For a long time Fourier's memoir was known only to a few, and, as it was based on the Newtonian hypothesis, that *radiation* is proportional to the difference of the temperatures of the radiating body and of the surrounding air, it happened that the interval which elapsed between its production and its publication, to a great extent destroyed its utility. In 1813 Dulong and Petit, by an admirable series of experiments, established another law, taking the indications of the air thermometer as the measure of temperature. This law is, that the cooling of a body depends, not, as Newton supposed, on the difference of temperature of the body, and the space into which it cools, but on the difference of exponential functions of the temperatures. The difficulty of the appearance of this law deterred philosophers from attempting its application to any but *one* of the problems. This one was that of the ring. M. Libri read, in 1825, to the Institute, and afterwards published at Florence and in *Crelle's Journal* in Germany, his analysis of this problem. No one appears to have doubted the accuracy of this solution until, in 1837, the author expressed his conviction that the whole was founded on an erroneous hypothesis relative to the resulting equation. The following year M. Liouville read a paper on the subject to the Institute, which he subsequently published in his own journal. In this paper he points out clearly the erroneousness of M. Libri's solution, but does not propose any other in its place. M. Liouville states in a note, that Prof. Kelland had preceded him in this matter, and promises to supply a solution. Thus, then, one case of theory appears to be made out. Last year the author again brought forward the subject of Dulong and Petit's law, but as experiments were wanting to give solidity to his views, he reserved the publication of his Memoir to a future time. The design of that paper (of which an abstract appeared in the account of the proceedings of the Royal Society of Edinburgh) is this: to show that all the formulæ of Fourier are quite accurate and applicable to physical phenomena. It will be observed that Fourier conceives the external and internal flow of heat to vary as the difference between two quantities, which he calls the temperatures. This hypothesis is not consistent then with nature; but it is not, therefore, altogether valueless; although the difference of temperature does not determine the flow of heat, it does not follow that the difference of no other quantities does so. It is highly probable that the flow of heat is due to the difference between some two things. Now Dulong found that for external radiation, the flow of heat depends on the difference of two exponential functions of the temperature. May it not, then, be the fact, that these exponentials, and not the temperature as measured by the air thermometer, are the elements by which nature proceeds? Why should it be supposed that temperature has any explicit connexion with the matter? Why, in fine, should we desire to retain our preconceived notions relative to internal transmission, when we find another law holds for external radiation? The author ventured on the hypothesis, then, that internal conduction follows the same law as external radiation, viz. that the flow of heat is proportional, not to the difference of temperature, but to the difference of two exponentials of the temperature. To obviate the confusion that would be introduced into our language by such an hypothesis, he further ventured to suggest that the term "thermature" should be adopted as the expression for this exponential function on which the flow of heat depends. This thermature would be the real measure of caloric—temperature of its effect on the thermometer. This quantity "thermature" is nothing else than Fourier's v. All that remains, then, in order to reduce the results of theory to those of experiment, is to substitute for v on which theory is made to depend, its value in terms of θ, the temperature as marked by experiment. It readily appears that $v = A\left(\frac{-\theta}{-a}\right)$. The author has tested this result by all the experiments which he could find. But he regretted that a want of experiments rendered it impossible to decide the matter, thus leaving the theory of heat in a most precarious state, whilst its practical applications are become so vastly important. He hoped by his comments, to excite some attention to

* Smeaton, in his report on the River Clyde, dated the 3rd September 1755, states the neap tides as only being sensible at Glasgow Bridge.

the subject, especially amongst those who are labouring in the kindred field of the theory of light.

Prof. Forbes made some remarks on the value of a full report on the state of theory on this subject, and hoped the Committee of the Section would forward a recommendation that Mr. Kelland be requested to furnish such a report, showing how far theory was outstripped by the accumulation of facts. The Section were aware that all Fourier's results were derived by the calculus from the hypothetic case of a hot ball of cast iron placed in various circumstances. The object of such experiments as he had been conducting at Edinburgh was to furnish the data on which to found a theory of the heating and cooling, under certain conditions, of an earth composed of various rocks and other materials which approach nearly to the actual substances. Bischoff, of Bonn, had, by plunging thermoscopes in cast balls of basalt, determined the rate of cooling of such materials with much precision.

Dr. Anderson 'On the Meteorology of Perth.'

Perth is elevated about thirty feet above the mean level of the ocean, and situate in lat. 56° 23′ 40″ N., long. 3° 26′ 20″ W. Dr. Anderson stated, that the magnetic variation, which seemed to have reached its maximum in 1815, was 26° 54′ W. in Nov. 1836; and that the magnetic dip was 72° 10′ in May 1838. The mean barometrical pressure deduced from a period of consecutive observations, continued from 1829 to 1835, was 29.802, the time of observation being nine o'clock in the morning. By a comparison of the means of each month, for the several years, with the mean of the entire period, it appeared that the means in defect greatly exceeded those in excess; from which he concluded, that the disturbing causes which produce a diminution of atmospherical pressure are more sudden, as well as more powerful, in their operation, than such as give birth to an opposite condition;—a result which implies that the causes contributing to a low state of the barometer are of limited extent and partial influence; and may be explained by referring them partly to the diminution of aërial elasticity occasioned by a rapid condensation of aqueous vapour, and partly to the combustion, by electricity, of large portions of carburetted hydrogen in the upper regions of the atmosphere, over the place of observation. Hence he inferred that an arithmetical mean between two observations, the one expressing the highest and the other the lowest height of the mercury, will rarely give the true average height for the mean interval of time between the observations. The mean annual range of the barometer at Perth, derived from a period of nine consecutive years, is 2.189 inches; but the extreme range for the same time, or the difference between the highest and lowest altitude of the barometer, was found to be 2.821 inches. The fluctuations, or deviations from the mean state, are greatest in December, and smallest in August. The mean temperature of Perth, derived from the maxima and minima of each day, according to observations continued from the beginning of 1829 to the end of 1834 inclusive, is 48°.14. The mean obtained from the annual means, by observations taken at nine o'clock in the morning, and half-past eight in the morning, is 47°.9; and the mean of the annual extremes, derived from the greatest heat and greatest cold, for each year, is 48°.25. Lastly, the mean of the highest and lowest temperature for the entire period of years is 47°.5. By a comparison of the mean temperature of the several months, it appears that in different years the month of July possesses the greatest uniformity of temperature, and the month of January the least. The temperature of March, April, and May, especially that belonging to the last of these months, has a considerable range in different seasons, on account of the variable winds in Spring; and the temperature of August and September seems to be still more fluctuating—a circumstance that occasions the late and early harvests which happen in different years. The lowest temperature, within the period to which the above observations refer, occurred on the 26th December 1830, when the instrument stood at 16°, and the greatest heat took place on the 28th of July of the same year, when the thermometer was at 79°. The greatest annual range for that year was therefore 63°; but the mean annual range for the entire period was only 57°.5. The most abrupt change of temperature occurs between the middle of October and the middle of November; and to this must probably be ascribed the increase of pulmonary complaints, which takes place at that gloomy and disagreeable season. The mean hygrometric state of the air at Perth, is when the atmosphere is charged with about four-fifths of the entire quantity of moisture it is capable of holding in the state of vapour at the mean temperature. The dew point, which corresponds almost exactly with the minimum temperature, in the case of the different months, is depressed about 6 or 7° below the mean temperature in winter, and about 8 or 9° below it in summer. The month of April possesses the smallest relative humidity, and the month of November the greatest; the former month being, in the ordinary acceptation of the term, the driest, and the latter the dampest month of the year. The mean quantity of rain which falls at Perth, derived from a period of six consecutive years, viz. from the beginning of 1829 to the close of 1834, is 30.89 inches. The greatest anomalies with respect to the quantity of rain which falls in different seasons happen in July, in which month the difference between the greatest and least quantity is 4.65 inches; and the smallest occur in November, when the difference is .81 in. The maximum quantity of rain for a period of sixteen years, is 31.01 inches; and the minimum quantity 15.59 inches. The annual number of fine days, deduced from six years, is 253, and the days on which there was either rain or snow, 112; the former being more than double of the latter.

'On the Cause of the Increase of Colour by the Inversion of the Head,' by Sir David Brewster.

It has been long known to all artists and tourists, that the colours of external objects, and particularly of natural scenery, are greatly augmented by viewing them with the head bent down and looking backwards between the feet, that is, by the inversion of the head. The colours of the western sky, and the blue and purple tints of distant mountain scenery, are thus beautifully developed. The position of the head, however, which I have described, is a very inconvenient one; but the effect may be produced, nearly to the same extent, by inverting the head so far as to look at the landscape backwards beneath the thighs or left arm. It is not easy to describe in any precise language, the degree of increase which the colours of natural scenery thus receive; but an idea may be formed of it from the fact that the colours of distant mountains, which appear tame and of a French grey colour when viewed with the head erect, appear of a brilliant blue or purple tint with the head inverted. I am not aware of any author, except Sir John Herschel, having attempted to explain this phenomenon. He has, if I rightly recollect, done this in his work 'On Light;' but whether it is in that work or not, I remember well, that he ascribes the increase of the colour to the circumstance that the inversion of the head causes the pictures of the coloured objects to fall upon a part of the retina not accustomed to the exercise of vision, and therefore less fatigued by the impressions of external objects: in the same manner as when we look long at coloured objects, the brilliancy of their colour or of any adjacent object is greatly diminished. An incidental observation led me to suspect the accuracy of this explanation, and upon inverting the landscape by reflection, I found that no increase of colour took place. I then viewed the inverted landscape with the head inverted, and found the colour to be increased as before. Hence, it appears that the increase of colour is not owing to the simple inversion of the object, or to our viewing it under unusual circumstances. That the augmentation of tint is not owing, as Sir John Herschel supposes, to the impression falling upon a part of the retina not so much accustomed to receive such impressions, is obvious from the fact that the tint is the same upon whatever part of the retina the image falls; and it is easy to see, that the very same part of the retina is affected, whether we look at an object with the head upwards or downwards, or in any other position, provided we look at it directly. In order to acquire some information on this subject, I requested a friend, who was unacquainted with any theoretical views that had been advanced, to make some observations on the change of colour of distant mountains. The result of these was to convince him that the increase of tint arose from the protection of the eye from lateral light, owing to the position of the head when inverted. On submitting the opinion to examination, I found that the tint was not increased by protecting the eye from lateral rays, even to a much greater extent than is done by the inversion or inclination of the head; and, therefore, that this could not be the cause of the increase of colour. In this perplexity about the cause of the phenomenon in question, I had an opportunity of observing the great increase of light which took place in an eye in a state of inflammation. This increase was such, that objects seen by the sound eye appeared as if illuminated by twilight, while those seen by the inflamed eye, seemed as if they were illuminated by the direct rays of the sun. All coloured objects had the intensity of their colours proportionally augmented; and I was thus led to believe, that the increase of colour produced by the partial or total inversion of the head, arose from the increased quantity of blood thrown into the vessels of the eye-ball,—the increased pressure thus produced upon the retina; and from the increased sensibility thus given to the sentient membrane. Subsequent observations have confirmed this opinion, and though I cannot pretend to have demonstrated it, I have no hesitation in expressing it as my conviction, that the apparent increase of tint to which I have referred, is not an optical, but a physiological phenomenon. If this is the case, we are furnished with a principle which may enable us not only to appreciate faint tints, which cannot otherwise be recognized, but to perceive small objects which, with our best telescopes, might be otherwise invisible.

Mr. Snow Harris's report on the working of Whewell's Anemometer at Plymouth, was read by the Secretary. It began, by pointing out the importance of such an instrument as this to meteorology, which gave a figurative delineation of the total amount of the aërial current in any given direction, and finally enabled us to arrive at what Mr. Whewell has aptly called an annual type of the winds for any given place. By comparing the types of different places with each other, the general annual movement of the atmosphere may be in some degree ascertained. An instrument capable of giving this integral result, has long been wanted—common anemometers only give the strength or velocity of the wind, and the time it blows in a given direction. The defects of construction of this instrument have been found in practice considerable: they are, 1, The difficulty of obtaining instruments sufficiently comparable; 2, Want of constancy of the same instrument, arising from deterioration of the wheel-work; 3, Liability to go out of order in storms; and 4, Difficulty of repair. Mr. Southwood, who communicated his experience of this instrument to the Association in 1837, made many improvements. But the scientific world is indebted to Mr. Kerr, of Plymouth, for carrying out the improvements, for which 10*l.* had been voted by the Association; and as no full account of the machine had ever appeared in the reports of the Association, Mr. Harris now gave a minute description of it, with its improvements as it now works; and many illustrative drawings of the machine and of its several parts—and its mode of acting—and registering—and describes its scale and graduation. The instrument being now effectively at work, Mr. Harris proposes at the next meeting to have completed a graphical delineation of the integral amount of wind shown by it at Plymouth for the entire year, and in the meantime sent drawings and tables which contain the results of its work for the last three months. The report concludes, by giving an account of the manner in which the sums had been expended, which were intrusted to the Committee for the purposes of this instrument; for the repair and tabulation of the results of Osler's anemometer at Plymouth and at Birmingham, and for conducting the original series of hourly meteorological observations at Plymouth.

Prof. Forbes made a report of the expenditure of 10*l.*, intrusted to a committee for the purpose of getting a plate engraved for printing ruled paper, such as was used in the several curved results of observations which had been exhibited to them so frequently since the commencement of the sitting. This had been done, and any member engaged in these inquiries could now be furnished with paper ruled with the utmost accuracy, at cost price.

Sir David Brewster felt himself precluded by the great number of papers yet to be read, from en-

tering at any length into an explanation of his method of illuminating microscopic objects. Considering a perfect microscope as consisting of two parts, viz. an illuminating apparatus, and a magnifying apparatus, he stated, that it was of more consequence that the illuminating apparatus should be perfect, than that the magnifying apparatus should be so; and that the essential part of his method consisted in this, that the rays which form the illuminating image or disc shall have their foci exactly on the part of the microscopic object to be observed, so that the illuminating rays may radiate as it were from the object, as if it were self-luminous. Now, this can only be well obtained, by illuminating with a single lens, or a system of lenses, without spherical or chromatic aberration, whose focal length, either real or equivalent, is less than the focal length of the object-glass of the microscope. The smaller the focal length of the illuminating lens or system of lenses, the more completely do we secure the condition that the illuminating rays shall not come to a focus either before they reach the object, or after they have passed it. When Dr. Wollaston recommended for an illuminating lens, one of three-fourths of an inch in focal length, in which the microscopic object was placed in a vertex of foci, where the rays crossed in a thousand points both before and after they fell upon the object, he could have had no idea of the new method of illumination. In the construction of a perfect microscope, Sir David Brewster recommended that the illuminating and magnifying apparatus should have separate and similar movements along the same rod or bar, and that the stage for the objects should be unconnected with both, and should have also a motion independent of both.

The improvement which he communicated on the Polarizing Microscope, was one which he had used for several years, and which consists in placing the analyzing prism or simple rhomb immediately behind the object-glass, that is, on the side of the object-glass next the eye. The great inconvenience of placing it between the eye-glass and the eye, had induced several skilful observers to reject the prism altogether as an analyser, or to substitute for it a plate of tourmaline, which is quite unfit for any observations in which colour is to be considered. The analyzing prism may remain constantly on the microscope behind the object-glass, without in the least injuring the performance of the microscope, and it should have a motion of rotation independent of the body of the microscope.

WEDNESDAY.

Section B.—CHEMISTRY AND MINERALOGY.

'On a New Method of ascertaining the Refractive Powers of Minute Bodies, and its application to Mineralogy,' by Alexander Bryson.

The means at present employed in ascertaining the refractive powers of crystalline substances, rendered it necessary to procure pieces not less than a quarter of an inch in size, which were then to be ground into prisms, before any idea of their refractive powers could be obtained. The microscope is well suited, with a slight alteration, to give minute differences in refractive powers. On the stage of the microscope is placed a piece of crown glass, with fine lines drawn on its first surface. If a piece of beryl, or any other mineral with parallel sides, is now placed on the glass, the lines will no longer be visible through the microscope, until it is raised above the crystal three hundredths of an inch. The difference of focus becomes an index of the difference of refractive power, between the glass plate and the crystal. The means adopted to ascertain minute changes in focal length, is a scale of hundredths of an inch, with a vernier dividing it into thousandth parts.

Mr. Espy gave a summary of his views with respect to the causes of the Diurnal Fluctuations of the Barometer, for which see Section A. Saturday, p. 794.

'On the Preparation of Alloxan, Alloxantine, Thionurate of Ammonia, Uramile, and Murexide,' by Prof. Gregory.

To prepare alloxan from uric acid, Liebig and Wöhler used nitric acid sp. g. 1.42, and separated the acid liquid from the crystals by means of a porous brick, thus losing the whole mother liquid. The author uses nitric acid of sp. g. 1.35. The action of this acid on uric acid must be kept moderate. When crystals of alloxan are formed, the whole is thrown on a filter, the throat of which is stopped with asbestus. That portion of the acid liquid which remains in the crystals is displaced by a few drops of cold water, and the crystals are purified by recrystallization. The liquid is again employed in the same way, and the crystals collected as before. Five such operations may be performed with the same liquid, each yielding a large crop of crystals; while the mother liquid is preserved, and yields a large quantity of parabanic acid, or oxalurate of ammonia. By this process the author obtains from 100 parts of uric acid, 65 of anhydrous alloxan, or 90 of alloxan + 6 aq. From alloxan, alloxantine is easily obtained by the action of sulphuretted hydrogen. Thionurate of ammonia is easily formed, by boiling a solution of alloxan with sulphite of ammonia and free ammonia. Uramile is also easily obtained, by boiling a solution of thionurate of ammonia, with an excess of diluted sulphuric acid. Murexide is obtained, as described by Prof. Gregory on the Thursday (p. 742). He now exhibited the last three processes. He also stated, that the theory of the formation of murexide was of great importance in reference to organic colouring matters.

Prof. Jacobi made some observations respecting his discovery of Galvanoplastics, or electrotype, from which, and from printed documents, it appeared that he had communicated a notice of the discovery to the Petersburgh Academy on the 5th of October 1838. In his pamphlet, 'Die Galvanoplastik,' the date of this communication is 5th of October 1839; but it was stated that this was a typographical error. The first published account of the discovery appeared, according to Prof. Jacobi, in a Petersburgh journal of the 30th October, 1838—(der St. Petersburger deutschen Zeitung). The attention of Mr. Spencer, the latter stated, was attracted to the subject as early as 1837, and in 1838 he communicated the result of some of his experiments to several persons in Liverpool. He did not, however, publish an account of them till 1839; so that Prof. Jacobi is undoubtedly entitled to the claim of priority of discovery, as far as publication is concerned, which usually determines the question.

Section C.—GEOLOGY AND PHYSICAL GEOGRAPHY.

Mr. Murchison exhibited several new geological maps of different parts of Germany, and especially directed attention to two inedited maps which the authors had prepared for his use, and of which he proposed to avail himself in subsequent researches. Amongst them was a map of parts of Silesia, Moravia, and Bohemia, by Leopold Von Buch; and the second a very large unpublished map of Germany, by M. H. Von Dechen, which contained a greater mass of important detail, as regards geological and mineral distinctions, than any map of the present period.

Mr. Murchison next called attention to the subject of the 'Old Red Sandstone of the Northern Counties of Scotland,' the general relations of which had been pointed out, and some of its fossil fishes described by Prof. Sedgwick and himself. On this occasion his object was, to mark distinctly the progress which had since been made in our knowledge of the structure and contents of this formation, in the same tract of country. In doing this, he referred to Mr. Hugh Miller, of Cromarty, who unaided had unravelled the complicated relations of the older stratified deposits around his native place, and had first endeavoured to describe a singularly formed animal with lateral wing-like processes, which has been found recently in considerable quantities on both sides of the Murray Firth. Mr. Murchison then adverted to the general views of Dr. Malcolmson, of Forres, who had re-examined all the fish deposits lying between the Orkneys and Aberdeenshire, and divided the old red sandstone of these parts into three measures, the middle and lower of which are distinguished by forms of fish peculiar to each. This work, illustrated by drawings, is now in the course of publication in the Geological Society's Transactions, and will form a subject of comparison with the work preparing by Prof. Asmus, of Dörpat, upon similar ichthyolites, and to which Mr. Murchison adverted in his communication, on the Geology of Russia (p. 800).

Prof. Agassiz was then called on to give his opinion on the winged fish, which, after a high encomium on the preparatory labours of Mr. Miller, he named *Pterichthys Milleri*.—Mr. Keen, of Elgin, stated, that he had found some years ago the same form, now named *Pterichthys Milleri*.—Mr. De la Beche remarked, that in rocks so much pervaded by peroxide of iron as old red sandstone, which peroxide was adverse to the growth of shells, it was reasonable to expect that fish would prove the more important organic remains, as they had the power of locomotion, and could move about in the water, where the peroxide fell to the bottom, and rendered it unfit for molluscn.

Mr. J. E. Bowman read a memoir 'On the Geology of Ceará, North Brazil,' and exhibited a series of specimens of fossil fishes, both of which were forwarded to him by Mr. Geo. Gardner, a native of Glasgow, who has been for several years, and still is exploring the botanical treasures of the interior of Brazil. The province of Ceará, which forms a portion of North Brazil, is situated between the 3rd and 8th degrees of south lat., and the 37th and 41st of west long. It is of an oblong form, its greatest length being about 100 leagues from north to south, and its width varying from 50 to 70 leagues. It is bounded on the north by the Atlantic Ocean, and on the west by a low mountain range, which separates it from the great inland province of Pianhy, and consists for the most part of sandy or gravelly plains, which remind the traveller of the descriptions of the Pampas of Buenos Ayres. Boulders of granite, gneiss, and quartz, sometimes of four feet diameter, and more or less rounded, occasionally occur; and here and there a low ridge of gneiss rock crops out, dipping at a very high angle to the N.W. For many leagues from the coast, the characteristic and prevailing vegetation of the plains is a beautiful species of palm, called Carnahuba by the Brazilians, (*Corypha cerifera* of Martius,) while that of the ridge of gneiss consists of various Cacteæ (of the genus *Cereus*), and a large Bromelia. At a distance of about 80 leagues from the north coast, and 10 leagues below the Villa de Icó, the nearly monotonous level of the country is broken by a mountain range, which makes its appearance to the eastward. This is the Serra de Pereira, which runs S.W. and N.E., and is 16 leagues in length, and its greatest height about 1000 feet above the surrounding plain. Its S.W. extremity is entirely of gneiss, but at its base is a coarse red conglomerate, containing rounded fragments of both primitive and secondary rocks. The country between Icó and the small Villa de Crato, 34 leagues to the S.W., is of a more hilly undulating character; more abundantly wooded, and only occasionally opening into the large campos or plains of the north. In this tract gold has been found in small particles, interspersed in a dark coloured diluvial soil, near the Rio Jaguaribe, but not in sufficient abundance to repay the speculators. At about 18 leagues south of Crato, the gneiss rocks are replaced by a grey-coloured primitive clay slate, and at the termination of this the secondary stratified series begins, the few rocks occurring from thence to Crato consisting of a white coarse-grained sandstone. Crato stands in the middle of a large undulating valley, among hills which are the flanks or lateral spurs of the long chain which separates the provinces of the coast from that of Pianhy to the west, and which here receives the name of Serra de Araripe. The highest parts of this range do not rise more than from 1,200 to 1,500 feet above the town of Crato; their tops are perfectly level, and continue so many leagues to the west and south, forming what the Brazilians call Taboleiras, or table lands. In all directions these hills consist of a light-coloured sandstone, which has sometimes a reddish tinge. In the bed of one of the largest streams, a section of the strata to a considerable depth, exposes a bed of limestone three feet thick beneath the sandstone, and resting upon a seam of impure coal two feet thick, which in its turn is placed upon another and lower bed of limestone. In these limestones no fossil remains could be found; the strata are all perfectly horizontal; and the level appearance of the whole Serra makes it probable they are so throughout. About 14 leagues to the south from Crato, is a branch or spur of this Serra, which projects 10 leagues to the eastward, on the south side of which is a small villa called Barra de Jardine, situated in a small valley upwards of a league in length, and about half a league across in its widest part. The deposit of fossil fishes (from which

these now exhibited were chiefly obtained,) is in an open place of the gently sloping ridge north of the villa; there the ground is covered with great abundance of rounded stones of various sizes, from that of an egg to blocks of several feet in circumference, consisting of a light-coloured, rather impure limestone, in which lines of bedding may often be perceived, and sometimes minute shells. They split very easily, and contain portions of fishes in a more or less perfect state; by far the greatest number, however, being so much broken, that it is with considerable difficulty that tolerably perfect specimens can be obtained. The space to which these limestone nodules are confined, is not more than 100 yards square, and scarcely any other kind of stones is to be found among them; but on every side of it the ground is covered with other rounded pebbles of sandstone, similar to the rock of which the Serra is composed. Three other deposits of fishes occur in the neighbourhood; one about half a league to the south, a second at Macapé, five lengues to the east of Jardine, and a third at Mundo Novo, three leagues to the west. These are all on the declivity of the low hills, between the valley and the Serra, and perfectly resemble the one described, in consisting only of the rounded fossiliferous limestone nodules. On breaking these nodules, many of them exhibit abundance of a minute bivalve shell. At Mundo Novo, Mr. Gardner found in the same nodule a very perfect specimen, of what he believes is a species of Turrilites, about an inch and a half long, and a single valve of a Venus, about half an inch in length, and in very excellent preservation. He was told by a person at Jardine, that a few years ago he found a small serpent coiled up in a stone which he had split, but this no doubt was a species of Ammonites. In the several hundred stones, however, which he broke in search of fish, he met with nothing of this description. These specimens Mr. Gardner had not sent over; neither had he accompanied those submitted to the Section, by any of the sandstone of the Serra de Araripe; but, from the fact communicated to me by M. Agassiz, that he has not yet met with Cycloid fishes in any older formation than the chalk, and as far as can be inferred from the minute bivalves, it is probable that the sandstone hills in which the deposits occur, belong to that geological epoch. He states, that he could nowhere find in the neighbourhood of Barra de Jardine, any limestone in situ. This circumstance, taken in conjunction with the fact, that the fossiliferous nodules show indications of stratification, and are found in detached localities, and not intermixed with those of the sandstone which surrounds them on every side, leads to the conclusion that they occur as a bed or layer of detached concretions in the sandstone, each fish or portion of one (for many seem to have been imbedded after being broken,) having attracted round it a sufficient quantity of the lime disseminated through the mass to form a nodule.

[We have been informed by Mr. Bowman, that M. Agassiz examined the whole collection of these fossils, and pronounced them to be from rocks the equivalent of the chalk formation, and to be entirely new to science, not only as to species, but genera. Mr. Bowman has placed the whole series, consisting of 150 to 200 specimens, at the disposal of M. Agassiz, in order that they may be figured and described in the 'Histoire des Poissons Fossiles.']

Lord GREENOCK announced the discovery of lead, on the estate of his brother, Colonel Cathcart, on the borders of Galloway and Ayrshire; the vein runs N.N.E. and S.S.W., and is not far distant from granite: the contained silver averages five ounces to the ton. Hæmatitic iron ore is in the vicinity.

Mr. FEATHERSTONHAUGH made a communication 'On the Geography of New Brunswick.'—He alluded to the ignorance which prevailed on this subject, at the time of making the boundary treaty; but as there was an unwillingness on the part of the meeting to enter on the political view of the question, Mr. Featherstonhaugh said, it was difficult to explain the subject satisfactorily. As it is one of extreme delicacy, and the report of the commissioners was some time since laid before Parliament, we think it better to refer all who are interested to the published Report.

Dr. HANNAY exhibited a section of the bed of the Clyde, made by the late Mr. Logan. In the survey a number of borings had been made, and different phenomena occurred. Skulls had been found twenty-eight feet in the silt, also armour, but no fossil remains.

The last paper brought before the Section was from Mr. KNIPE, 'On the Vale of Solway, and Closeburn Basin.'—Mr. Knipe stated, that the new red sandstone occurs both on the north and south of the Solway river; the subjacent limestone occasionally occurs. At Aiket Muir, and at Ecclefechan are coal measures. New red sandstone extends up the river Annan to Moffat; in this is situated the famous Corncockle Muir quarry, where footmarks in the sandstone were discovered some years ago. These marks are also to be seen at the Craigs Quarry, some of which were shown at the Birmingham meeting. In the Closeburn Basin are new red sandstone and carboniferous limestone; a basaltic dyke cuts through it.

TUESDAY.

SECTION D.—ZOOLOGY AND BOTANY.

Prof. Graham (of Edinburgh) in the chair.

Mr. SMITH, of Deanston, exhibited a model and gave a description of a Salmon Stair.—The object of this construction was to allow of the passage of salmon up streams where mills or other impediments existed. After various efforts, Mr. Smith succeeded in erecting one near his own residence, which answered the purpose. The salmon, by means of a dyke constructed by the side of the mill-stream, were enabled to pass up the stream whilst a wire defence kept them from falling into the mill-stream.

Dr. M'DONALD suggested that the dam should be larger than that proposed by Mr. Smith, as the larger the dam the less would be its inclination, and the fish would have less difficulty in ascending.—Mr. SMITH stated that the steps were six feet asunder, and it was equally applicable to steep places or rivers. The fry were never injured in passing down the stream, although they came in contact with the mill-wheel. The fish are not deterred in their journeys by this apparatus, as they had been counted, and in one instance 180 were found above and 182 below.

Prof. AGASSIZ gave an account of his researches on the developement of the embryo in the ova of fishes, more especially of the family Salmonidæ. He detailed at great length the successive changes undergone by the various systems of organs. The object he had in view in these investigations was to ascertain if there existed any relation between the forms of fish of the present day, during the successive stages of their developement, and the permanent forms of fish found in the older strata of the earth. The details of the Professor's views were illustrated by drawings.

Sir W. JARDINE observed that, in the structure of the Salmonidæ, as in most other animals, the anatomical details were in accordance with the habits of the animal. The nerves of taste were small, and this sense was dull. There was also a want of nerves in the skin, and the sense was not acute, as the animal might be touched without its knowing it. The organ of sight was highly developed, and the power of this sense was very great. The organ of hearing, though largely developed, was not adapted for collecting the vibrations of the air, as a gun might be fired over salmon and they would not move; he believed the ear of the salmon adapted to perceive the vibrations of the water, for, if the water they were in was moved at a great distance, they became aware of it.—Mr. FORBES thought the bifurcation of the cilia must have been an optical illusion; the existence of cilia at all in such a position, he thought, extraordinary. —Dr. LIZARS was quite certain of the existence of the cilia in the nasal membrane, as he employed only low powers, and could then see them very distinctly, and they were also seen by the artist who executed the drawings. He had not seen the metallic scales referred to by Prof. Agassiz, and this gentleman had also traced the epidermis on the scales, further than he had done himself.—Prof. AGASSIZ had not seen the cilia on the nasal membrane.

Messrs. FORBES and GOODSIR on a new genus of Ascidians.—They had lately discovered two species; one of them was found in the mud-filled cavity of a bivalve, dredged from thirty fathoms water, at the mouth of the Frith of Forth; two specimens of the other were found near Rothsay. The appearance of these animals was so peculiar that they were unable to determine their position in the system till dissection displayed their relation to the Tunicata, and revealed their interesting character. The animals of this genus are—*free, elongated, dilated posteriorly, respiratory and excretory orifices exserted, the first being at the anterior extremity and in the axis of the animal.* As both the species were found in muddy ground, the genus was named *Pelonaia.* The species from the Frith of Forth, *P. corrugata*, is characterized by transverse somewhat irregular rugæ, a dark brown colour, and a length of two inches and a half. The Rothsay species, *P. glabra*, is smooth, with a slight villosity, greyish white, length one inch. The following anatomical peculiarities distinguish these from other Ascidians:—1, The respiratory opening has no radiated folds or papillary fringes. 2, The respiratory sac is elongated, radiated, exhibits transverse folds, which contain the primary branches of the branchial artery and vein, and are tied to the internal surface of the muscular sac and to the respiratory tubes by a longitudinal row of thread-like bands, on each side. It gradually contracts posteriorly into the œsophagus. 3, The digestive tube floats free in the capacious cavity of the muscular sac, except where it is tied down by muscular bands, and it terminates in a free floating and radiating extremity in the anterior, and half the length of the animal from the posterior opening of the sac just mentioned. 4, The vascular system exhibits no heart, and in consequence of the peculiar relative position of the respiratory sac and the other viscera, the system is symmetrical, the blood flowing backwards in the branchial vein and systemic artery, and forwards in the systemic vein and branchial artery; these two systems forming a dorsal and ventral vascular trunk. 5, The reproductive organs consist of two elongated sipunculated tubes, shut at one extremity, opening at the other into the cavity of the muscular sac, and closely attached to its inner surface. The orifices of these tubes are situated at the anterior third of the animal. 6, The principal peculiarities of the muscular cloaca is its firm adhesion to the internal surface of the tunic. In consequence also of the attachment of the viscera to its internal surface along the lateral line *only*, its cavity is much more capacious, resembling in this respect the water-filled cavities of the bodies of certain *Echinodermata.* A strong transverse band is placed behind the excretory orifice. External and internal symmetry is the leading peculiarity of *Pelonaia.* It is this symmetry which renders the genus valuable, as it reveals the structure and relations of the different organs in the unsymmetrical ascidians. We may now state with certainty that the branchial vein, heart and systemic artery of the typical ascidians correspond to the dorsal vascular system of the annulose animals, and the systemic veins and branchial artery to the ventral vascular system in some of the latter. The genus is also interesting as it indicates the relations of the Mollusca to the Annulosa, and to the Echinodermata.

Mr. PATTERSON read a paper on Medusæ.—After briefly noticing some of the specific distinctions of two species of Medusæ common on the Irish coast (*Cyanea Lamarckii* and *Aurelia aurita*), Mr. Patterson stated, that his object was chiefly to direct the attention of the members to the Acalepha of the British shores—a portion of our Fauna hitherto uninvestigated. With this view he described at some length their habits and appearance. He next proceeded to detail some of their peculiarities of organization, especially the difference observable in their filamentary appendages, and the varying number of the mouths and arms. Our ignorance of their physiology was exemplified by a series of questions relative to the organs of sensation which they possess, and the origin and uses of their luminosity, their stinging powers, their means of defence and propagation, their length of life and their peculiar parasites. It was stated that we are ignorant, not only of the structure of the acalepha, but even of the species which frequent our shores—an ignorance arising from the necessity of studying these animals in a living state, and also from the want of proper descriptions and figures. Those which may be confided in are given by Müller, Sars, Mertens, and Escholtz, in comparatively scarce works; and, as two are written in German and one in Danish, they are sealed books to those who are ignorant of these languages. In consequence, we are in continual danger, if we venture to name one that appears unknown, of adding to the existing con-

fusion. He next mentioned the points of interest presented by the acalepha, in consequence of their analogies in several respects, both to other classes of animals, and to the corolla of phenogamous plants.

Mr. Forbes said that it was a disgrace to British Natural History that so little had been done on the Medusæ. There were more of these animals in the Frith of Clyde than any other part of the kingdom, and he believed, that not only new species but new genera would be found there amongst these animals; and he hoped he was addressing some naturalist in Glasgow, that would follow up this subject. This group of animals was an illustration of the value of mere number in the arrangement of animals, their parts were always reducible to the number 4, whilst in the Echinodermata the number 5 prevailed. Whatever objections might be urged against the use of numbers in systematic arrangements, number was an important element of distinction amongst the members of both the animal and vegetable kingdom. The sting of these animals depended on a secretion; it was very powerful; he once accidentally applied some water to his face in which he had washed his hands after being stung by an acalephic animal, and the face became painful in consequence.

Sir W. Jardine read a communication from Mr. Schomburgk, 'On the various Modes of Fishing employed by Indians in the West of Guiana.'—Although the Ichthyology of South America be little understood by European naturalists, yet the native Indians are practically well acquainted with the various tribes that are found in the magnificent streams of the New World. An acquaintance with about eighty species has thus been made by Mr. Schomburgk. The Indians in their fishing excursions use canoes, which are propelled and directed by paddles in a peculiar manner. The canoes on the Essequibo are mostly formed of a hollow tree, and small corials are used formed in the same manner. Another kind of boat is also used, called a pakasse, and formed out of the bark of a tree. "When we ascended the river Berbice," says the author, "two Wauawai boys belonging to our party, navigated one of those pakasses. They were perhaps not more than eight years old, but we were highly delighted to see how ably they managed it. The boat seemed to fly through the water, and the juvenile steersman directed its course with such judgment and precision that it never grounded, though it went over places where there was not more than eight or nine inches water. They were equally expert in the use of the bow and arrow; and, wherever they observed one of the finny tribe, the pakasse was halted, the bow strung, and off flew the pointed arrow, and when taken out of the sand, which the water barely covered, we generally observed a fish struggling for liberty." After describing the descent of the rapids in which these rivers abound, and the appearance of a band of travellers halting on the shores of the river, he adds—"During night commenced the fishing of lan-lan and others of the family Siluridæ. After the hooks have been baited with fish or animal flesh, they are carried out in the stream, the line to which they are attached being about thirty to forty fathoms long. If the Indian feels inclined, he keeps the end on the land in his hand, but frequently he takes a forked stick, which he drives into the ground, and, after having tied some dried bushes to the fork, he leads the stray line over it. If a fish should bite, the line being drawn by the baited fish, will disturb the dry leaves, make a noise, and the Indian hurries to seize the line and to haul the fish in. If it be a lan-lan (*Silurus*) or a large paramima (*Phractocephalus bicolor*), some considerable skill is necessary to haul the fish in, without breaking the line or the hook. Many of the Siluridæ issue a sound when taken out of the water, but few so loud and so continued as the paramima. The Indians have always a bludgeon in hand, with which they beat in the thickly armed skull, and each blow is sure to produce a loud grinding sound; so that we who were lying in our hammocks knew whether a lan-lan, paramima, or any other fish had been secured. The Indian considers that a large fire kindled at the water's edge is sure to attract such fishes as take the bait only during night, and they never fail, therefore, to have a fire or a large brand when they are fishing for lan-lans or paramimas. If large blocks of granite impeded the river near our corials, all hand-lines which could be spared or procured were set in requisition to fish for pirais (Serra-salmon). The avidity with which they take the bait ensured success to the least practised, and if the place proved a haunt of the pirai, the Indian was sure to secure his dinner. The natives possess great art in throwing the hand-line from the shore into the stream: and it is a pretty sight to see the line circling in the air and descending in the water at a great distance from the bank or rock which the angler has selected for his stand." The detail of other modes of fishing was also entered into, and drawings of the paddles, hooks, rods, lines, and instruments used in fishing were exhibited.

Mr. Patterson read the Report of Mr. Thomson on the Irish Fauna, including only the Vertebrata.

This report was drawn up at the request of the Association, and will enable the British naturalist to ascertain what is the extreme western range of his species. From the different circumstances which influence the distribution of animals and plants, we do not find species of the former in Ireland, resembling those of the continent, as we do in the latter, and the animal kingdom has no representative of *Erica Mediterranea*, *Menziesia polifolia*, *Arbutus unedo*, &c. The Fauna of Ireland is compared with that of Great Britain, but the former ranges over only 4° of longitude, whilst the latter is double. The *physical* character of Ireland would make but little difference, although elevation may be the cause of the existence of two vertebrals—the ptarmigan (*Tetrao lagopus*) and the Alpine hare (*Lepus variabilis*). They may, however, be influenced by *climate*. The difference of temperature between Ireland and Great Britain does not attract or repel animals from one to the other; otherwise it has an influence. The stoat (*Mustela erminea*) very rarely changes its garb in Ireland. Birds, even in the north, which are migratory in Britain, are stationary in Ireland, as the quail (*Perdix coturnix*). Many of the soft-billed birds sing throughout the year, which are silent in winter in Great Britain. Although the Cyprinidæ (among fishes) increase towards the south of Europe, there are fewer in Ireland than England. The *Scolopax rusticola*, *S. gallinula*, *S. gallinago*, and *Sturnus vulgaris*, are more abundant; mammalia are fewer than in Great Britain. Cheiroptera are remarkably deficient. In the genus *Mus* there is one, not found elsewhere, *M. Hibernicus*. The squirrel and dormouse are absent, and there are no examples of *Arvicola*. *Lepus Hibernicus* is known only to Ireland. The polecat (*Mustela putorius*) is unknown. *Mustela vulgaris* is much more rare than *M. erminea*. The mole (*Talpa Europæa*) is absent. Of *Sorex*, there is but one species, called provisionally by Mr. Jenyns, *S. Hibernicus*. Of birds, the species that appear in Great Britain, and not in Ireland, are chiefly occasional visitants. There are no Ophidian reptiles in Ireland. In Amphibia, the toad (*Bufo vulgaris*), is absent; and the frog (*Rana temporaria*) is said to have been introduced. The natterjack (*Bufo calamita*), is only indigenous to Kerry. Tritons prevail. In fish, the families in which there is greatest deficiency compared with Great Britain are, *Percidæ*, *Sparidæ*, *Teniodæ*, and *Raiadæ*; there is a deficiency of fresh-water fishes. The number of species are Mammalia, 29; Aves, 230; Reptilia, 2; Amphibia, 3; Pisces, 150. The Report terminated with the expression of a hope, that the invertebrate animals would be included next year.

Mr. Vigors hoped the Invertebrate Fauna would be added, as that was the original intention of the Committee in calling for the Report. There were great difficulties in the way, but the Fauna of Ireland was one of great interest to the naturalist, and, if completed, much that is new might be anticipated. In the department of marine zoology, we might hope for the assistance of Messrs. Patterson and Forbes. The insects would form a difficult class; he believed that many of the common insects of Ireland, as some of the Lepidoptera, were different species from the English.

Prof. Graham read the Report of the Committee 'for Engraving Skeleton Maps, for recording the distribution of Plants and Animals.'

A grant of 20*l.* was made at the last meeting of the Association, for engraving these maps. The Committee found, however, that they could not engrave the required number with that expenditure, and accordingly had recourse to *lithography*, which in this instance has an advantage over engraving, in that alterations in the map may be more easily made. Three maps were arranged, one of each hemisphere, and another of the British Isles. The superintendence of these was intrusted to Mr. Brand, who had for some time been engaged in preparing a series of tables or catalogues for the Botanical Society of Edinburgh, and as the latter were to contain a variety of topographical details, it was thought that by executing both schemes simultaneously, the accurateness and completeness of both would be materially promoted. The details chiefly sought to be given with fulness were, those of the *river* and *mountain systems*, which exercise so important an influence on vegetable and animal productions, and which must form the basis of all schemes for illustrating their geographical disposition. It was also thought desirable to mark the chief elevations at different points, in order to show more readily the prominent features of the globe, and for the same object all important lakes have been carefully laid down. The political boundaries of countries, with the names and position of their larger towns, although of no value as regards the object immediately in view, have likewise been marked, for the purpose of aiding researches among works on natural history, and of facilitating reference to the ordinary maps. The maps already made are not considered as *completed*, and it is recommended that they should be transmitted "in proof" among such parties as might be likely to suggest corrections or additions of a useful character, and that thereafter they should be printed off, and sold at the lowest remunerating price. The maps already prepared were exhibited to the Section, and distributed amongst the members.

Mr. Vigors read a short communication from Sir Thomas Phillips, 'On the Migration of Birds on certain parts of the Coast of Ireland,' from which it appeared, that so long since as 1684, observations had been made on the migration of Brent geese from the barony of Forth, in the county of Wexford. Mr. Vigors could confirm the truth of this statement at the present day; the document was interesting, as showing the permanence of the instincts of these birds.—Mr. Selby related an instance of all the sparrows having deserted a certain district in Rossshire. Birds were very punctual in their returns and departures, and he had observed for many years, these events to occur on the same days.

'Remarks on the Synonyms and Affinities of some South African Genera of Plants;' by Dr. W. Arnott.

The object of these remarks was to prove, first, that the *Flacourtia rhamnoides* of Eckl and Zeyh, and perhaps also of Burchell, was the *Doryalis zizyphoides*, E. M., and approached more to Euphorbiaceæ than to either of the orders with which it has been associated. Secondly, that the genus *Schmidia* (or *Ornitrophe*) does exist in South Africa, although omitted from all the Floras, and that several of Thunberg's and E. Meyer's species of *Rhus* belong to it. Thirdly, that *Hippobromus* belongs to Sapindaceæ. Fourthly, that *Eriadaphore* of Nees von Esenbeck, is identical with *Phoberos* of Lour. Fifthly, that *Trimeria* of Harvey has been already erroneously described by Sprengel, as a *Celastrus*; and, sixthly, that *Ophira* of Linnæus, is the same as *Grubbia*, Linn.: but that *Ophira* of Lamarck's 'Illustration des genres,' is a very distinct genus, which has been lately described by Dr. Klotzsch, of Berlin, under the name of *Strobilo carpus*, and that the true structure of these genera appears to ally them on the one hand to Hamamelideæ, and on the other to Santalaceæ, to which last, if Dr. Klotzsch's analysis were quite correct, they would decidedly belong.

'Remarks,' in continuation, on a paper read by the Author (G. T. Fox), at Birmingham, 1839.

The paper on 'Cetology' was accompanied by a letter, giving an account of the origin of the bones of a whale, lately discovered in the rubbish of the crypts of the keep of Durham Castle. The letter professed to be an original composition of John Cosin, Bishop of Durham, in 1661, and was communicated by a gentleman, as coming from a collection of papers on Durham Castle, belonging to the late Mr. Surtees (the historian), and then in that gentleman's possession. No doubt being entertained of the authenticity of the letter, it was printed in the Durham newspaper at the request of the professors of Durham University, and was made use of, with the full permission of the gentleman who communicated it, by the author, in

the paper above referred to. The letter (*Athen.* No. 619) is referred to in the volume prepared by the Association. It has only recently come to the knowledge of the author, that the gentleman who furnished the letter, has acknowledged it to be a fabrication of his own, and that no such original letter exists. The author of the paper forbears to comment on this occurrence, but feels it a duty to the Association, to himself, and to the cause of truth, to make this known, even at the risk of impugning the consistency of character of the gentleman who has thought proper to lead to the dilemma.

Dr. LANKESTER made a communication on the Growth of Cotton, and read a paper on this subject, drawn up by Mr. Felkin, of Nottingham.

The subject of the growth of cotton wool in British India, engaged the attention of this Section last year, General Briggs having then read a paper on the subject. At present, hopes are entertained, that the American long staple wool may be replaced by a long staple, from Sea-Island seed, to be grown in the sunderbunds of Bengal, situated at the mouth of the Ganges—a district now jungle, but similar in marshy soil and exposure to warmth, moisture, and the influences of the sea, to the islands on the American coast; and which circumstances seem from experience to be absolutely necessary to the production of the length, fineness, and general quality of the fibre in question. The seeds of the plants of that class of Gossypium, known commonly as Sea-Island, and picked with extraordinary care, were laid upon the table, in the hope that members, who had the means of giving to an experiment the necessary care, and securing to the plants sufficient warmth, pure air and light, might be disposed to sow a few seeds, and report the results. Pods, grown from this seed in a factory in Manchester, the heat of which varied from 100° Fahr. to 56° Fahr., unripe, because of insufficient heat and a bad atmosphere, were laid upon the table. They were of good size as compared with those grown in the Sea Islands of the American coast, and if fully ripened, the staple would be of great length. These pods were stated to be of twice the size of those of Bengal, producing the short staple. The object of the experiment was to ascertain if the length of the staple could be secured elsewhere than in the Sea Islands, the other circumstances attending the growth of the plant being made as similar as possible. It was conducted by Thomas Bazley, Jun. Esq., boroughreeve of Salford. The seed was sown in April 1840, but if sown the preceding winter might have been better. Transplanted in May. The earth was formed of two-fifths river sand, two-fifths light soil, one-fifth horse-manure; fifteen inches in depth was found too shallow, and thirty inches is recommended as preferable. This soil was kept in a decidedly moist state, by frequent sprinklings of the plants with a solution of one ounce of common salt in a gallon of water. The plants in America are found in the driest season saturated in the morning with dew. The plants in Manchester are five feet high, well spread out; showed in July the usual bright scarlet and yellow coloured flowers, and became full of pods in August. A number of male and female plants were grown together.

Mr. FELKIN thought this experiment important, as it proved that cotton, produced even under the disadvantageous circumstances of the specimens before the Section, had as long a staple, and was as fine as that from America. At the present moment experiments were about to be tried on a large scale in India, for the purpose of producing cotton for British consumption. The persons engaged in it were anxious to obtain information from scientific and practical men, and this was one of the objects of bringing the subject before the Section.—Dr. W. ARNOTT observed, that there was great difficulty in identifying the species of cotton.—Dr. A. BURN had spent some time in India, and attended to its productions. Egyptian cotton had been grown there, and the staple was as long and fine as that from Egypt. Many of the native Indian cotton-plants produced a fine staple.

WEDNESDAY.

Prof. Graham in the chair.

Dr. MARTIN BARRY read a paper on the first changes in the ovum in mammiferous animals, with especial reference to the remarks made by Prof. Agassiz, in his paper on the embryology of the Salmonidæ (p. 847). These remarks were given as an outline of a memoir communicated by Dr. Barry to the Royal Society in March last.

Prof. AGASSIZ regretted that he had not been earlier acquainted with the researches of Dr. Barry, as they would have assisted him much in his labours. His object had, however, been different, for he had rather a geological, than a physiological end in view. In his researches he had wished to ascertain whether any resemblance could be traced between the forms assumed by the embryo of the fish during its developement, and the permanent forms of the various species of fossil fishes.

Dr. ALEXANDER BURN made a communication on the growth of cotton in India, and exhibited samples of four different kinds of cotton, besides some produced from Egyptian seed; all of which were cultivated last year at Kaira in Gujerat, the object being to show that in the produce of the cotton plants indigenous to India, great variety existed. The cotton differed in several important points; the chief of which were, the length, colour, softness, dryness, evenness, and strength of fibre. These being admitted, together with the fact that all attempts have failed during the last twenty years, to introduce successfully the culture of foreign varieties of cotton into India, it was argued that the grand desideratum, the improvement of the staple so as to equal American cotton, would best be attained by attention to the selection of indigenous seed, and improving it by cultivation, a point which has hitherto been entirely overlooked or neglected. The Egyptian cotton exhibited, was remarkably fine; it had been valued in Glasgow at 1*s.* 3*d.* per lb.; of all the specimens, it alone had been raised by irrigation. Dr. Burn remarked that his experience had led him to the conclusion, that without the command of artificial irrigation, no great quantity of cotton, superior in staple to Surat, could be produced in the Bombay Presidency. The facilities, however, for irrigation in India, were very great, and antiquarian research aided by local tradition, and the shattered remains of tanks and canals now everywhere observable, demonstratively proved that in former times irrigation was the means by which a vast population subsisted, or were protected from famine, consequent on the capricious failure of the annual monsoon rains. Surat cotton is all cultivated as an annual. The Gorea is a perennial plant; none of it is ever exported, being all consumed in the country.

Mr. LLOYD inquired as to whether length of staple and fineness of cotton were in proportion to each other, in the specimens exhibited.—Dr. BURN stated, that many of the shorter staples were very fine, and especially of the Indian cottons. He had learned from a Glasgow manufacturer this morning, that length of staple was not of so much importance as fineness, as machinery was now constructed by which a short staple could be easily worked.

Dr. LANKESTER, in the absence of Mr. Forbes, exhibited some coloured water brought from the Baltic by Mr. Murchison.—Dr. WALKER ARNOTT had examined the water; the colouring matter consisted of a filamentous substance. He could not detect, with the small glass he possessed, any articulations in the fibres, and suspected that they were not of vegetable but animal production.—Dr. FLEMING, who had spoken with Mr. Murchison on the subject, stated that the sea was covered with these floating filaments for miles in extent, producing a dirty white discoloration in the water.

The business of this Section also was now concluded.

TUESDAY.

SECTION F.—STATISTICS.

In consequence of the renewed discussion between Dr. Alison and the Rev. Dr. Chalmers, and the general interest excited in Scotland at the present moment, by the subject of pauperism, the Section again met in the College Church.

Prof. JOHNSTONE reported the progress made by the Committee appointed at the Newcastle meeting to inquire into the Statistics of the Mining Districts; they had only procured accurate returns from one colliery village, but they hoped before the next meeting to complete a more extended survey.

Mr. BRYCE, of Belfast, reported that the Ulster Statistical Society had made such progress in their inquiries into the state of education and the condition of the linen trade in the north of Ireland, that they would be able to present the results in a complete form at the next meeting of the Association.

Mr. PORTER read a very elaborate report on pawnbroking in Ireland, and on the beneficial results which had followed from the establishment of a Mont de Piété, in connexion with a Loan Fund at Tanderagee. In order to ascertain as nearly as possible, said Mr. Porter, the amount of business which is done throughout Ireland, I considered that one whole county, that of Armagh, in which I reside—one large trading town, such as Belfast—and the metropolis of Ireland, would furnish data on which to calculate, if necessary, the pawnbroking business of the whole kingdom. I, therefore, deposited at every pawnbroker's, in these places, an article of clothing, and received duplicates or tickets, each bearing a number on it, showing the order in which articles are received and registered. In seven days after I deposited another article of dress at each pawnbroker's as before, and received in like manner duplicates or tickets, and in a few cases where there was some doubt as to the numbers written on the tickets, which are not always very legible, I deposited a third article. The amount of money lent is calculated, on an average, at 3*s.* on each article, except in Dublin, and there it is found to be about 4*s.* Mr. Porter then read the following table:—

City or Town.	Number of Pawnbrokers.	Number of Pawns in Twelve Months.	Amount lent in Twelve Months at 3*s.* each Pawn.	Amount charged in Pence for Duplicates.	Profit after Printing Duplicates, and deducting 6 per cent. for Capital, and 6 per cent. for Stock.	Population.
Armagh	4	97,980	£14,697	£408 5 0	£1,170 3 10	10,518
Lurgan	3	43,440	6,516	181 0 0	516 3 7½	2,842
Newry, part of	2	40,680	6,102	169 10 0	483 7 1½	See next table.
Tanderagee	1	15,540	2,331	64 15 0	184 13 8½	1,559
Portadown	1	14,940	2,241	62 5 0	177 10 9½	1,591
Markethill	1	9,660	1,449	40 5 0	114 15 6½	1,043
Total in the County of Armagh	12	222,240	£33,336	£926 0 0	£2,646 14 2	
Newry, whole of	7	120,000	£18,000	£500 0 0	£1,425 15 6	13,134
Belfast	35	737,280	110,592	3,072 0 0	8,760 19 1½	67,388
Dublin	42	3,820,200	764,040	15,917 10 0	56,107 11 3	265,316

The poor of the county of Armagh, therefore, pay for duplicates nearly one thousand pounds annually, the poor of Newry five hundred pounds, the poor of Belfast above three thousand pounds, and those of Dublin near sixteen thousand pounds. The paupers' pence charged by the pawnbrokers, in the county of Armagh, in twelve months, exceeded the county grants to dispensaries by the sum of 132*l.* 17*s.* 6*d.*

Paupers' pence being	£926 0 0	
County grants to dispensaries	793 2 6	
		132 17 6

And the estimated profits of the pawnbrokers within the county of Armagh, after paying for the printed tickets, and deducting six per cent. for interest on their capital, exceed the whole of the Grand Jury presentments for charitable purposes by 260*l.* 10*s.* 4*d.*

The profits being		£2,646 14 2
Grand Jury presentments, viz.		
To 13 Dispensaries	£793 2 6	
County Infirmary	593 3 1	
District Lunatic Asylum	999 18 3	
		2,386 3 10
		£ 260 10 4

Having succeeded in proving to the gentry, to the clergy of all persuasions, and to the merchants of the town of Tanderagee, in which I reside, that the Mont de Piété system of pawnbroking would present a mitigation of evil, they co-operated with me in the establishment of an institution, embracing a charitable

pawn office, a loan fund, and a bank for savings, all under one administration, managed by the same board of directors, with whom I have the pleasure of acting as one of the honorary secretaries. The following is an abstract of the result of the operations of the Tanderagee Mont de Piété:—

	No. of Pawns deposited.	No. of Pawns released.	Amount lent on Pawns	Amount received on Pawns released.	Interest received on Pawns released.
1839.			£. s. d.	£. s. d.	£. s. d.
For nine months—Jan. to Sept.	12,312	8,521	1,500 6 0	1,023 9 8	76 0 2½
For three months—Oct. to Dec.	2,900	3,020	422 8 4	395 4 0	34 15 3½
Total for twelve months	15,212	11,541	£1,922 14 4	£1,418 13 8	£110 15 6
1840.					
For nine months, less two weeks, to the present period	6,523	6,698	864 9 11	991 5 5	104 11 0
					Increase of interest, the Releases being greater than the Pawns.
Decrease on the nine months of 1840, less two weeks, compared with nine months of 1839	5,789	1,823	£635 16 1	£42 4 3	£28 10 9½

In nine months of 1839, 11 out of 16 articles were released, and 3,791 arttcles remained in store, over and above the number of articles released; and in 1840, up to the present period, 175 articles were released, more than the whole number pawned.

Loan Fund Department.

	Number of Loans.	Amount Lent.	Weekly Instalments.	Interest, and Fines received.
1839.		£	£ s. d.	£ s. d.
For nine months, Jan. to Sept.	3,745	15,286	15,107 11 11	608 2 5
For three months, Oct. to Dec.	1,011	4,141	4,247 11 2	178 11 2
Total for 12 months	4,756	19,427	19,355 3 1	786 13 7
1840.				
9 months, less 2 wks. to present period	1,980	8,150	8,303 6 7	291 8 4
Decrease on the 9 months, less 2 wks. of 1840, compared with 9 months of 1839	1,765	7,136	6,804 5 4	316 14 1

Savings Fund Department.

	Lodged.	Withdrawn.
Savings in nine months of 1838	£ 698	£ 406
— in nine months of 1839	994	594
— in twelve months of 1839	1,303	943

Mr. Porter then gave an account of a Mont de Piété since established at Portadown; and mentioned that he had been last year successful in establishing one in Belfast, and he hoped at a future period to give some statistical account of its operations. He then proceeded to show the advantages of the Mont de Piété over pawnbroking. In conclusion he observed, that though he had been but a few days in Glasgow, he had directed his attention to the same subject, and gave the result of his inquiries. "There exists (he observed) in Glasgow, a system of pawning quite new to me, and, I believe, wholly unknown in Ireland. These are called wee or little pawns. The supposed advantages or inducements to pawn at these brokers is as follows: they give money on articles of lesser value than the licensed pawnbrokers will receive; they give about 25 per cent. more on the deposits; they are open earlier and later than the usual pawnbrokers. The manifest disadvantages are: they give no tickets, and consequently there is no security; the time for redeeming these pawns is one month, instead of one year; and the interest charged is one penny per week for one shilling, or at the rate of 433⅓*l.* per cent. per annum. I have been able to make some inquiry into the extent of business transacted by the licensed pawnbrokers in Glasgow. Having made calculations from the tickets of six of the pawnbrokers, and the amount of their transactions, ranging from twenty-eight to thirty, thirty-three, forty-two, fifty-three, and sixty-one thousand pawns annually, it may be presumed these present a fair average; and if so, the number of pawns annually lodged would be 997,832, which, at 1*d.* each for the ticket, produces 4,157*l.* 12*s.* 8*d.* The average amount lent on each pawn which I have seen is nearly 2*s.* 6*d.*; but as I have only seen the duplicates of the very poorest class of pawners, I believe that 3*s.* would be a fair average. The amount lent out in Glasgow in twelve months would thus be about 149,674*l.* I am informed by Captain Millar, the superintendent of the Police, that there are 400 unlicensed pawn-shops within the police district, and about 300 without those limits. I find by the evidence of these brokers themselves, above an average of 58,172 articles are pawned with each of them annually. This number, multiplied by 700, gives the total number of pawns in one year (not including the business of the twenty-four licensed pawnbrokers) as 40,720,400. I ascertained that the sums lent on these deposits varied from a halfpenny to one shilling, and, in a few cases, even above that sum, but that the average, on the whole, is fourpence. Now, in order to err on the safe side, I will calculate at an average of only threepence for each deposit, and the amount is, nevertheless, above half a million of money, lent to the very poorest and most distressed class within the city of Glasgow and suburbs, and this sum lent out on interest of 433*l.* 6*s.* 8*d.* per cent."

Dr. Chalmers then addressed the Section in a speech of more than three hours duration, and the discussion between him and Dr. Alison occupied the greater part of the two following days. Having already given a specimen of the peculiar eloquence of Dr. Chalmers, we do not think it necessary to report his second speech at similar length. But we shall endeavour to lay before our readers what could with difficulty be collected from the speeches, a simple outline of the points in issue; avoiding, so far as is possible, the expression of an opinion, as the controversy, like most similar disputes, ended in leaving the two parties just as they were. Dr. Chalmers opposed a compulsory provision for the poor, as useless and mischievous, relying on the result of the experiment which he had tried in St. John's Parish. By dividing that parish into districts of a manageable size, and intrusting each to the charge of an officer of the church, called in Scotland a deacon, he had so reduced the amount of pauperism, that the whole number of paupers who had been admitted on the parochial funds of St. John's for three years and nine months, was twenty, at a monthly expense of 5*l.* 10*s.* 6*d.*, and a yearly expenditure of 66*l.* 6*s.*; during this period not one had been sent to the Town Hospital,* or made chargeable in any way on the fund by assessment. From this experiment he inferred that Church extension was the surest means for the extinction of pauperism. There were two sources from whence relief might be obtained; compulsory provision, or the fund *ab extra*, and a developement of the internal resources of the poor, or the fund *ab intra*; if he could show that the latter was more efficient for relief, more beneficial to the poor, and more advantageous to society, he asserted that he would have established an irrefutable case for Church extension, because he could also prove that faithful ministers were the most efficient creators and trustworthy distributors of this sacred fund. He then enumerated the sources of this fund. The first, was the formation of moral and provident habits in the poor themselves; this, he said, had been ostentatiously neglected by the legislature, and hence he predicted that the system of Poor Laws for Ireland would be one of the most magnificent failures and magnificent humbugs on record. The second source was the domestic affections, the kindness and readiness for mutual assistance which existed between members of the same family; the third was the spontaneous charity of poor neighbours; the fourth, and least, was the benevolence of the rich. An experience of twenty years had proved that the fund derived from these sources was perfectly adequate to meet the demands of destitution, and in proof he quoted the answer to a circular which he had sent to his deacons; all of whom, in reply, stated that the system established by Dr. Chalmers had been found perfectly adequate to meet the claims of destitution in the parish of St. John for a period of twenty years. That this had been effected without cruelty, or neglect of the pressing claims of want, appeared from the fact that the number of imported paupers into the parish during that period had exceeded the number of exports.

It was felt by several members, after the discussion, that it would be desirable to discover what was the amount of destitution recognized in Glasgow as having a claim to legal relief. They therefore visited the wynds and closes in the interval that elapsed between the conclusion of Dr. Chalmers's speech and the resumption of the debate on the following day. No words could adequately pourtray the scenes of wretchedness, poverty, filth, vice, and disease which came under their cognizance. Parochial relief was found to be withheld from conditions of humanity, the very existence of which are scarcely known in England. It was, therefore, inquired, when the discussion was resumed, what was the condition of destitution to which relief would be granted by the deacons of St. John's?—and to this no definite answer was obtained. It was secondly asked, whether the deacons, on whom the working of Dr. Chalmers's system mainly depended, were obtained exclusively from the parish of St. John's; and whether the supply of labour which they procured for paupers out of work, was exclusively derived from that parish? The answers to both questions being negative, it was contended that the experiment could not be of universal application, because Dr. Chalmers had the *élite* of Glasgow, whence he could select his deacons, and they again had the whole amount of labour in Glasgow whence to procure employment for applicants, by using a name so influential as that of Dr. Chalmers.—A doubt was expressed as to the efficacy of new churches, because the poor abstained from those already erected for want of clothing; and evidence was required to prove the assertion of Dr. Chalmers, that a desire to go to church would necessarily lead to the procuring of a proper dress. —It was asserted that there was an inconsistency in allowing legal relief for disease, and not for destitution, the distinction between the two cases vanishing the more closely they are examined.—Character was declared to be a perilous element to take into account, when the fact of relief was under consideration; it bestowed irresponsible power on the deacon or other relieving officer, who might estimate moral character by religious opinions, sectarian views, or other points on which men are allowed to differ by the law of the land, but not by the law of party opinion; it was therefore contended, that character should not be an element *in the claim* to relief, though it should be a guide *to the nature* of relief.—It was denied that the mere fact of a compulsory provision for the poor had weakened family affection, or neighbourly kindness in England; abuses of the poor laws might have produced the effect in certain localities, but on the whole it was averred that the English equalled the Scotch in domestic attachment and the interchange of neighbourly services.—A doubt was raised of the efficiency of Dr. Chalmers's system in case of a strike, when the strikers not only deprive themselves of employment, but also the inferior hands, whose labour is dependent on theirs.—While the influences of education and religion were recognized, it was questioned whether starvation did not greatly weaken the efficacy of the teachings of both; and it was asserted that the system of Dr. Chalmers had been tried in Dundee and in some other places, and that it had failed. Finally, it was asked whether the whole plan of Dr. Chalmers might not be described as a scheme for compelling the poor to support the poor, and whether so stated, it did not seem to be unjust even if practicable?—These were the doubts raised by Lord Sandon, Sheriff Alison, Dr. Alison, Dr. Cowan, and other gentlemen, and they remained unsolved at the end of the third day's discussion. We have given a brief summary of the argument, so as to enable those who are interested in the subject to comprehend its tendency at a glance; and we

* The Town Hospital of Glasgow is an establishment similar in principle to an English workhouse, and is supported by a parochial assessment.

need not, therefore, revert to the discussion in the remainder of our report.

Section G.—Mechanical Science.

Mr. Jeffreys described a fire-grate, exhibited in the model-room, which may be placed, he said, so far forwards as to be quite out of the chimney, and radiate a two-fold quantity of heat into the apartment; and yet there shall be no tendency to send smoke into the room. By an addition, in accordance with the same principle, fresh air is introduced, comfortably warmed before it enters the room.

Mr. Mitchell observed, that Mr. Vignoles having drawn attention to the subject of Timber Bridges, with reference to their application to the economical construction of Railways, he begged to report the result of some experience in works of this nature in the Highlands of Scotland. About twelve years ago he had erected a bridge across the Spey, consisting of an arch of 100 feet span; another about six years since of two arches of 100 feet span, with stone abutments and piers; a third across the Dee, of five arches of 75 feet span, with timber piers; besides a number of others of smaller dimensions. Economy was the chief object in building bridges of this material. It was found they were one-third less expensive; that across the Dee with timber piers less than half: the period of duration he found to be from thirty to forty years; the accumulated value of the saving being more than equivalent to rebuilding the structure. In his opinion, viaducts of this material might be beneficially applied in the construction of railways, of course being suitably constructed to resist the violent action and heavy weights of railway trains. He was glad to hear that Mr. Vignoles considered that railways might be constructed with gradients so much steeper than what has been hitherto considered practically advantageous. Of course, there could be but one opinion about the propriety of a level and direct line both for safety and speed; but the subject was of great importance to Scotland, where neither the country admits nor the traffic demands such perfect construction. He thought practical experiments should be made on the amount of locomotive traction at different inclinations, and with different rates of speed; it appears that hitherto engineers had acted more by theory than observation. One fact he would mention. On a railway recently constructed, he found, that with inclinations of from 1 in 70 to 1 in 100, locomotives travelled nearly at full speed, and at one point, an inclined plane of half a mile with a gradient of 1 in 22, a train of loaded carriages, with a gross weight of thirty-five tons, was drawn up with ease, of course at a reduced speed, but not such as to affect the general rate of travelling; the carriages also passed along curves with radii less than 500 feet.

'On the application of Native Alloy for Compass Pivots,' by Capt. E. J. Johnson, R.N.

Among those portions of a ship's compass which most affect its working, are the pivots and caps on which the needle and card traverse, and which, like the balance of a chronometer (but of far more importance to the practical navigator), should not only be fitted with the most scrupulous attention to accuracy, but be made of materials capable of maintaining a given form under the trials to which such instruments are necessarily exposed. Having examined a great variety of compasses which had been used at sea, wherein Capt. Johnson noticed that their pivots were generally injured, and often by rust, he searched numerous records of experiments for its prevention, and for improving the quality of steel in other respects, by means of alloys of platinum, palladium, silver, &c. (he alluded particularly to the experiments of Dr. Faraday and Mr. Stoddart); and Mr. Pepys having obligingly supplied Capt. Johnson with specimens of similar kinds of steel to those used by them, these examples, together with pivots made of the ordinary kind of steel, and hardened and tempered in the manner recommended by eminent instrument-makers, were placed in a frame for experiment; and to these again Capt. Johnson added certain contrivances of his own, such as rubbing a steel pivot with sal-ammoniac, then dipping it into zinc in a state of fusion, and afterwards changing the extreme point. Some specimens he coated with a mixture of powdered zinc, oil of tar, and turpentine; and others again were set in zinc pillars, having small zinc caps, through which the extreme point of the pivot protruded after the manner of black lead through pencil tubes. The whole of the specimens were then placed in a cellar, occasionally exposed to the open air, examined from time to time during more than half a year, and their several states, as respected oxidation, duly registered. Without going into the details of this register, the general result was, that not any of the kinds of steel pivots used in this trial, except such as were coated with zinc, remained free from rust, while the pivot made of the "native alloy" which is found with platinum, completely retained its brilliancy. Capt. Johnson then applied a more severe test to this singular substance, first, by placing sulphuric acid, and then nitro-muriatic acid upon it; but even under this trial he could not observe that any change had been effected, although the blade of a penknife, subjected to a similar process, was rusted to the centre. Having enumerated the facts respecting the trials to which he had subjected this curious material, Capt. Johnson stated the conclusion that he had come to, namely, that it is sufficiently tough not to break, and hard enough not to bend, under the trials to which it would be *fairly* exposed; and that being alike free from magnetic properties and liability to oxidation from exposure to the atmosphere, it possesses the requisite qualities for the pivot of the mariner's compass; and he could not but anticipate that, when fitted with a ruby cap to correspond, it would be found greatly to improve the working. Besides the application of this substance for compass pivots, Capt. Johnson stated that it might probably be found advantageous for other instruments, and especially for the points of the axes of the dipping needles fitted, on Mr. Fox's plan, for use on board ship.

Mr. Hawkins has used this "native alloy" for several years in tipping the points of pens, and not a single instance exists of any of these pens showing the least symptom of wear. He tried native alloy on a cap, in comparison with ruby, when he found that in the same circumstances, the ruby was ground away with diamond dust twice as rapidly as the native alloy. He had made engravers' tools of the same metal, and when made too sharp they cannot be blunted on the Turkey stone, but only by diamond dust.—Sir J. Robison could bear testimony to one of Mr. Hawkins's pens, which he had used four years, not being at all changed.—Mr. Hawkins stated that this alloy consists of native crystals of osmium and iridium in conjunction with platinum.

Mr. Lang 'On an Improvement on the Air Pump.' A letter from this gentleman was read, but from some mistake the paper itself had not been received.

Mr. Hawthorn 'On certain Improvements on Locomotive and other Engine Boilers.'—The object of this improvement is to prevent what is technically called "priming," to heat the steam on its passage to the cylinder, and to employ return tubes, as well as direct tubes, for heating the water. The advantages are said to be, that no water is carried with the steam into the cylinder, and a saving of fuel, through the arrangement of the tubes, from 30 to 40 per cent.

Mr. Scott Russell observed, that the plan of surcharging steam was much used in America. They work the steam expansively. Mr. Russell thought the *dome* shape in the fire box inferior to the *flat staged* box, and was afraid that the steam returning from the cylinder through the boiler would merely abstract and not communicate heat.

'On the Fan-Blast as applied to Furnaces,' by Mr. Fairbairn.

In explaining the methods to be pursued in adapting furnaces to the fan-blast, Mr. Fairbairn observed, that it was well known that its application to the cupola for melting pig iron, was attended with the most complete success; and the object of the present inquiry was to determine how far the same mode of blowing was applicable to furnaces on a large scale, for the purpose of smelting ores. Objections had been made to Mr. Fairbairn's plan, on account of the very low pressure at which the air is introduced into the furnace, and its insufficiency to force it through a mass of material such as is contained in the furnaces of this country, and which is from thirty to forty feet in depth. To these objections Mr. Fairbairn replied, that the same had been urged against the introduction of the fan-blast to the cupola; that, in his opinion, its efficiency was as the quantity discharged, and not the pressure, which regulated the passage of the air, from the "twyres" to the top of the furnace. The fan-blast, when supplied with large apertures into the furnace, would, in his opinion, increase the process of calcination, effect a more equable temperature, and produce a superior quality of metal. It appeared, therefore, of importance that the experiment should be made; and Mr. Fairbairn offered to superintend its introduction, provided the proprietors of the numerous works in this country agreed with him in opinion, that the process would be advantageous both as regards expense, and the improved quality of the metal produced.

Mr. Smith thought the plan well worthy of being tried. It is not the *force* of the blast that is necessary, but the *quantity of air* introduced. In a cupola, in which the blast is given by the fan, the iron is brought down in half the time that was necessary with the cylinder blast. Mr. Smith has no doubt of the success of the fan-blast in smelting furnaces, the heat being more uniform.

Mr. Smith 'On Propelling Boats on Canals.' Mr. Smith proposed that the steam power in the boat should drive two large wheels, of thirty feet diameter, which should bite the ground at the bottom of the canal. He exhibited a working model on this principle, which succeeded on the small scale; and he stated, that he had tried it on a larger scale with the power of four men, and it had also succeeded. The wheels might be either on each side of the boat, as in the model, with a provision for a play of three or four feet, that they might accommodate themselves to inequalities at the bottom of the canal; or there might be one wheel in the centre of the boat, if constructed on the twin principle.

Mr. Scott Russell was not sanguine as to the success of this plan. The wheels must be made very heavy, in order to give the propelling power, and their weight would have an injurious effect at the bottom of the canal. A large steam-boat would be necessary in order to get sufficient power, and if this large vessel were propelled at high velocities, the surge from the bows would be very great, and the stern would drag in the water.—Mr. Smith said, that he had confidence in the plan, notwithstanding the objections raised, and intended to try it on a large scale, and would report next year to the Association the results, whether favourable or otherwise.—Mr. Glynn remarked, that an attempt was made some years ago by Mr. Seaward, to propel boats on canals by means of wheels composed of two rims, with steps between them as a ladder, running on the bottom of the canal; but it was abandoned.

Mr. James Johnston, of Greenock, 'On a New Rain Gauge.'—Mr. Johnston described a new rain gauge, so constructed that the receiving funnel or orifice at which the rain enters, is always kept at right angles to the falling rain. By the action of the wind on a large vane, the whole gauge is turned round on a pivot, until the front of the gauge faces the quarter from whence the wind blows; and by the action of the wind on another vane attached to the receiving funnel, the mouth of the funnel is moved from a horizontal towards a perpendicular position according to the strength of the wind. The receiving funnel and vane attached to it are balanced with counterpoise weights, in such a manner that the wind, in moving them, has as much weight to remove from a perpendicular position, in proportion to their bulk, as it has when moving an ordinary-sized drop of rain from the same position; by this means the mouth of the gauge is kept at right angles to the falling rain.

Mr. Mylne gave an account of a High Pressure Filter for Domestic Purposes.—Mr. Thom stated, that from experience he found it was better to filter *downwards* than upwards.—Mr. Hawkins agreed with Mr. Thom, that filtration downwards is superior to filtration upwards; he preferred charcoal to sand for filtering, and preferred filtering without high pressure.—Mr. Dunn explained Ponton's Electro-Magnetic Telegraph,' which instrument was exhibited in the model room.—Mr. Fairbairn described 'Hall's Patent Hydraulic Belt for Raising Water.'—M. le Comte de Lille explained his method of laying down Wood Pavement, as exemplified at Whitehall.

WEDNESDAY.

The Rev. Dr. Paterson gave an account of an Improved Life-Boat, which he called a Riddle Life-Boat, because the bottom is like a riddle. The sides of the boat consist each of a hollow elliptical tube, to be made of sheet-iron, and from this it has all its buoyancy, which is unaffected by any influx of water. This boat, he said, was light, easily propelled, and drew only a foot or two of water; and besides being used for reaching vessels in distress, or carrying passengers to steam-boats, it might be itself carried as a ship's boat—to be ready for use in danger, or difficult landing.

Mr. Williams stated, that this boat seemed to be original, and that he (Mr. Williams) would make a trial of it on a large scale.—Mr. Vignoles thought it might be usefully employed for pontoons.

Mr. Thom 'On an Improved Rain Gauge.'—It consists of a cylinder two feet long, and seven inches diameter, sunk in the earth till the mouth of its funnel (which receives the rain) is on a level with the ground surrounding it. Into this cylinder is put a float, with a scale or graduated rod attached to it, which will move up or down as the water rises or falls in the cylinder. There is a thin brass bar fixed within the funnel, about half an inch under its mouth, with an aperture in the middle just large enough to allow the scale to move easily through it. The upper side of this cross bar is brought to a fine edge, so as to cut but not obstruct the drops which may alight on it. There is an aperture also in the bottom of the funnel, through which the water must pass into the cylinder, and through which also the scale must move; but this aperture requires to be made no larger than just to permit the scale to move through it freely. When the gauge is firmly fixed, and the float and funnel in their places, water is to be poured in till the zero of the scale is level with the upper edge of the aperture.

Mr. Thom gave an account of the Water Filters used at Greenock and Paisley. A species of trap rock or amygdaloid, common in the neighbourhood, is broken to the size of small peas, and mixed with fine sharp sand. The water is filtered by passing directly downwards through the media, which media are in their turn cleansed by passing the water through them upwards. The filter does best at two feet of pressure and under.

Mr. Lothian gave a description of a Revolving Balance.—The opposing arms of this balance are curved, being formed of two spirals, the one situated vertically over the other, and both bending round a common centre of movement, which is placed in the pale of the upper curve. The spirals diverge from each other near their origin, but approach and merge together at their extremes, and thus form one continuous curve, which is grooved on its circumference. The cords or chains which suspend the receiving scale and counterpoise act against each other in this groove—the weight of the scale, when hanging from a lengthened radiant of the upper spiral, being in equilibrio with the greater weight of the counterpoise when hanging from a shorter radiant of the lower one. When this state of rest is disturbed by loading the scale, the balance moves round, and, in the progress of its revolution, the opposite eccentricities of the spirals combine in changing the ratio of the leverage, and thus originate a self-adjusting power, by which the loads of both cords are mutually moved into equilibrium. The receiving scale thus commences with greater, and ends with less mechanical power than the counterpoise—a circumstance which is in harmony with the purpose of employing an unchanging weight to measure others both less and greater than itself; while the principle is one which concentrates the power and abridges the size of the machine. In order, however, that the total amount of adjusting power thus generally obtained may be equally drawn upon and advantageously distributed throughout the movement of the balance, a definite relation is established between the weight of the counterpoise and the rates at which the accumulating weight of the scale and the leverage of the lower spiral increase. The leverage of the upper spiral, being derived from these ascertained conditions, is made to preserve a rate of decrease which accords with the previously regulated increase in the leverage of the lower curve; while both spirals have their precise form determined by the additional consideration of the direction in which the cords exert their power on the circumference of the balance. In their calculated formation, the two spirals are thus dependent on and related to each other, while together they are component parts of one continuous curve, in which the mutual and combined changes of leverage are made to follow an equable, as well as a general progressive gradation; by which means, the balance is moved through equal angles by equal weights. In machines intended for weights of considerable amount, the balance is made to revolve about an axis, which is itself supported, a little above its centre, on knife-edge rests, so as to combine the movement of the revolving balance with the libration of the common one—the coincidence of a pointer from the axis with the ordinary pointer of the machine showing when the indication is practically unaffected by friction. In machines for weights of still greater magnitude, the articles to be weighed are made to act, in part, as their own counterpoise, by adopting differential curves to diminish the descending power of the scale; by which a comparatively small counterpoise is made to adjust the unsupported difference of weights greatly exceeding itself.

Mr. Williams 'On the Combustion of Coal and the prevention of the generation of Smoke in Furnaces.'

Mr. Williams observed, that in treating on steam and the steam-engine, the subject divides itself into the following heads:—1st, The management of *fuel* in the generation of *heat*; 2nd, The management of *heat* in the generation of *steam*; 3rd, The management of *steam* in the generation of *fuel*. The first belongs to the *furnace*; the second to the *boiler*; and the third to the *engine*. The first, although exclusively in the department of chemistry, is to be considered in the Mechanical Section, for the purpose of showing its connexion with the practical combustion of fuel in the furnace. The main constituents of coal are carbon and bitumen: the former is convertible, in the *solid* state, to the purpose of generating heat; the latter, in the *gaseous* state alone, and to this latter is referable all that assumes the character of *flame*. The greater part of the practicable economy in the use of coal being connected with the combustion of the gases, this division of the subject is peculiarly important. We all know that combustible bodies cannot burn without air: the actual part, however, which air has to act is little inquired into beyond the laboratory; yet on this part depends the whole of effective combustion. Having explained the nature of combustion, Mr. Williams went on to show, that all depended on bringing the combustible and the air into contact in the proper quantities, of the proper quality, and at the proper time—the proper place, and the proper temperature. The conditions requiring attention were, 1st, The quantity; 2nd, the quality of the air admitted; 3rd, The effecting their incorporation or diffusion; 4th, The time required for the diffusion; and, 5th, The place in the furnace where this should take place. Mr. Williams exhibited several diagrams, representing the several processes connected with the combustion of a single atom of coal-gas or carburetted hydrogen, and also of bodies or masses of such gas. The essential difference between the ordinary combustion of this gas in combination with atmospheric air, and that resorted to by Mr. Gurney in combination with pure oxygen, in what is called the Bude light, was then explained. By these diagrams, it was shown, 1st, What was the precise quantity of air which the combustion of gas demanded; 2nd, The degree or kind of mixture which combustion required; and, 3rd, That the unavoidable want of time in the furnace to effect this degree of diffusion was the main impediment to perfect combustion, and the cause of the generation of smoke. From the consideration of these details, the inference followed, that smoke once generated in the furnace cannot be burned,—that, in fact, smoke thus once generated became a new fuel, demanding all the conditions of other fuels. Mr. Williams dwelt much on the chemical error of supposing that smoke or gas can be consumed by bringing it into contact or connexion with a mass of incandescent fuel on the bars of a furnace; that, in fact, this imaginary point of incandescence, or the contact with any combustible body at the temperature of incandescence, was peculiarly to be avoided, instead of being, as hitherto, sought for; and hence the failure of all those efforts to prevent or consume smoke. The great evil, then, of the present furnaces was their construction, which did not admit the necessary extent of time (or its equivalent), time being essential to effect the perfect diffusion of mixture of the gas, of which every chemist knew the importance, and on which the experiments of Prof. Graham were so conclusive. Mr. Williams then proceeded to show, that unless some compensating power or means be obtained, and practically and economically applied, we can never arrive at full combustion, or prevent the formation of smoke. This compensating power was shown to be obtainable by means of surface, and was well exemplified in the blow-pipe: the remedy then, for the want of time in the furnaces, may be met, by introducing the air in the most effective situation, by means of numerous small jets. Mr. Williams submitted the primary law to be this; viz. that no larger portions of air, that is, no greater number of atoms of air, should be introduced into any one locality, than can be absorbed and chemically combined with the atoms of the gas with which they respectively come into contact. Again, that the effecting, by means of this extended surface, this necessary diffusion was the main condition which required attention, and not that of temperature. Mr. Williams then exhibited the diagram of a boiler to be constructed on the above principles, and stated that he had an experimental boiler at work, which fully proved the accuracy of the principle.

Sir John Robison stated, that the Committee of Recommendations had suggested the appointment of a Committee to make a further investigation, and report to the Association at their next meeting.—Mr. Vignoles observed, that the gradual increase of the aperture for the blast of cupolas for second meltings of metal, the areas of which were now at least fifty times larger than formerly, proved the necessity of admitting large quantities of oxygen in combustion, which could only be obtained in its combination with the nitrogen, the other component part of atmospheric air.

OUR WEEKLY GOSSIP.

Since we announced the projected formation of *The Shakespeare Society*, so many applications have been made at our office for further information, that we are happy to have it now in our power to publish the Prospectus, which has just reached us, and copies of which may be obtained, with the names of the Council, &c., from Mr. Howe, 153, Fleet Street.

It is acknowledged on all hands, that no country of the world possesses a Drama comparable to that of Great Britain, and that, in the hands of Shakespeare, it reached the utmost perfection it ever has attained. It is singular, therefore, that all that has hitherto been done for its illustration has been accomplished by individuals, and that no literary association has yet been formed for the purpose of collecting materials, or of circulating information by which it may be thoroughly understood and fully appreciated. The chief object of this Society is the publication or republication of works connected with, and illustrative of, the Plays of Shakespeare and his contemporaries; and of the rise and progress of the English stage and English dramatic poetry, prior to the suppression of theatrical performances in 1647. Some of these productions still remain in manuscript, and many of those which were printed even as late as the reign of Charles I., are of such extraordinary rarity, that very few copies are known to exist. They are preserved in the cabinets of collectors, or are deposited in some of our public libraries. All matters relating to the lives of our early dramatists and actors, and explanatory of their conduct, characters, and opinions, will come within the design of the Society. It is likewise intended to print and reprint old plays, to be edited from the original copies, accompanied by biographical sketches and notes. Many of the tracts from the prolific pens of such authors as Thomas Churchyard, Thomas Nash, Robert Greene, Gabriel Harvey, Thomas Dekker, Nicholas Breton, Anthony Munday, Samuel Rowlands, Barnabe Rich, Thomas Jordan, John Taylor, &c., &c., are known to contain matter of great interest and curiosity, in connexion, either immediate or remote, with our early stage and its poetry; and to the republication of these, the attention of the Society will be directed. In time, it is hoped, complete sets may thus be afforded of the scattered productions of distinguished and once popular writers. The works of Stephen Gosson, Thomas Lodge, John Northbrooke, William Rankins, George Whetstone, Philip Stubbes, Thomas Heywood, J. Greene, and others, who wrote for or against theatrical representations in their comparative infancy, throw much light on the history of our early drama, and these (most of which are of the rarest possible occurrence), it is intended to reprint in a connected series.

The Society is established on a plan similar to that adopted by the Camden. Each member is to subscribe 1*l.* annually (to be paid in advance), or may compound by the contribution of 10*l.* at once. No portion of the funds will be expended upon useless

decoration; but the works will be issued in as cheap a form as is consistent with that handsome appearance which a library-book ought to possess. Amongst works suggested for immediate publication are the following:—

Sir Thomas More: an unprinted Historical Play, on the Life and Death of that great Statesman and Lawyer; written and licensed for the Stage about the year 1590, and preserved in the original manuscript in the British Museum.—*The Diary and Account Book of Philip Henslowe*, between the years 1590 and 1610, in which he entered his various Transactions relating to Plays, Players, and Dramatic Authors (parts only of which were imperfectly printed by Malone), from the original MS. at Dulwich College.—*The School of Abuse*, by Stephen Gosson.—*An Apology for Actors*, &c., by Thomas Heywood.—*Tarlton's News out of Purgatory.*—*Pierce Pennyless his Supplication to the Devil*, by Thomas Nash.—*The Pleasant Comedy of Patient Grissell*, by Thomas Dekker, Henry Chettle, and William Haughton. 1603. With an introduction on the origin of the story, and its application to the Stage in various countries of Europe.—*Greene's Orpharion.*—*Chrestoleros.* Seven Books of Epigrams, by Thomas Bastard.—*Pasquil's Jests.*—*Catharos Diogenes*, in his Singularity, &c., christened by him a Nettle for nice Nosea, by Thomas Lodge...*The Crown Garland of Golden Roses*, &c., by Richard Johnson.—*Look to it, for I'll stab ye*, by Samuel Rowlands.—*A Royal Arbour of Loyal Poesai*, consisting of Poems and Songs, by Thomas Jordan, 1664. It contains various dramatic ballads, particularly those founded upon Shakespeare's 'Much Ado about Nothing,' 'Winter's Tale,' 'Merchant of Venice,' &c.—*A Collection of Broadsides and Manuscript Pieces*, in prose and verse, principally relating to Authors, Plays, Actors, and Theatres, during the reigns of Elizabeth, James I., and Charles I.

The silver shield, won by the Duke of Orleans at Goodwood, whose subject is "Achilles instituting horse-races over the tomb of Patroclus," finds little favour with our critical neighbours, as a work of art: and the amphora designed by M. Klagmann, and approved by the duke, as his gift to that meeting, for a prize, next year, is put forward by them as a triumphant example of their own superiority. The amphora is about two feet in height, and of the weight of about 4,000 francs. The handles are grasped by two victories, "of most graceful action," according to these critics. An elegant frieze, divided into two compartments, surrounds the vase. The first represents the famous tournament of Lyons, at which Bayard made his first essay in arms; and the second the magnificent *carrousel*, got up by Louis XIV., in 1662, in honour of Mademoiselle de la Vallière. Above the frieze, four medallions represent four horses, of different breeds; and, at the foot of the vase, figure, on one side, a man holding an escutcheon, with the initials of the prince, and on the other small groups of young children, also holding escutcheons, on which the names of the victors, (horses and owners) will be engraved. The execution of the work has been intrusted to M. Durand, under M. Klagmann's direction.

Silence still reigns in Paternoster Row—and in the dearth of home publications, we have been casting anxious eyes over the promises of our neighbours. Among works forthcoming or in course of publication at Paris, we may enumerate the following:—The first volume of a 'Histoire du Parlement de Normandie,' by M. Floquet;—the fourth part of M. Capefigue's 'L'Europe, pendant le Consulat et l'Empire de Napoléon;'—a work by General L'Etang, 'Sur les Moyens d'assurer la Domination Française en Algérie;'—'De l'Humanité, de son Principe et de son Avenir,' by Pierre Leroux;—a work by the Chevalier Artaud, Member of the Institute, entitled, 'Histoire de la Vie et de toutes les Ouvrages Poétiques de Dante Alighieri,' forming an Introduction to the author's translation of the *Divina Commedia*;—'Les Artisans Illustres,' by MM. Bethune and Plon, being a history of the great Artisan family, from the simple workman to the rich manufacturer—from Roubo to Chaptal;—the complete Collection of Reports addressed by M. Dumont d'Urville to the Minister of Marine, during the expedition of the *Astrolabe* and *Zélée*, accompanied by Charts;—a 'Histoire Financière de la France,' by M. Bresson;—a new inquiry, added to the many which have already speculated on the meaning concealed by Rabelais under his Abbaye de Thélème, entitled, 'Rabelais et l'Architecture de la Renaissance,' by M. Ch. Lenormant, Member of the Institute;—an 'Essai sur le Texte Grec de l'Inscription de Rosette,' by the same Author, being the third number of a collection of Egyptian Archæological Miscellanies, the two former of which were the 'Recherches sur Horapollon,' and the 'Cercueil de Mycerinus;'—'The Life and Works of Ambroise Paré, the great Restorer of Modern Surgery,' by M. Malgaigne;—a work on the 'Abolition de l'Esclavage Ancien en Occident,' by M. Eugène Biot, the son of the illustrious *savant* of that name;—a Translation by M. Jules Lacroix into French Verse of Shakspeare's 'Macbeth;'—a 'Voyage dans l'Asie Mineure, en Mésopotamie, à Palmyre, en Syrie, en Palestine, et en Égypte,' by M. Baptistin Poujoulat, intended as a sequel to the 'Correspondance d'Orient,' by the same Author and M. Michaud:—an 'Essai Historique sur l'Esprit de Réforme Politique en Espagne,' by M. Duverine;—and, for the sake of its embellishments, 'Heures Nouvelles' (a new prayer-book), by the Abbé Dassance, adapted, by French and Latin texts, for use in Paris and Rome, and illustrated by twelve compositions, representing the life of the Saviour, from the pencil of Overbeck;—the first volume (to be extended to four) of the 'Révolutions des Peuples du Nord,' by M. Chapin;—and 'La Fin des Temps,' a volume containing a collection of remarkable prophecies which have from time to time appeared, relating to these latter days, with a notice by the editor, M. Eugène Bareste—and for the lovers of light reading, 'La Chambrière,' by Frédéric Soulié—and the 'Nuits de Londres,' by M. Méry.

We shall next week conclude our Report of the proceedings of the British Association.

DIORAMA, REGENT'S PARK.

NEW EXHIBITION, representing THE SHRINE OF THE NATIVITY at Bethlehem, painted by M. Hénoux, from a Sketch made on the spot by David Roberts, Esq. A.R.A., in 1839. "The spectator may almost suppose himself in the very birthplace of the Saviour."—*Times*. Also, THE CORONATION of Queen Victoria in Westminster Abbey, by M. Bouton. Open from Ten till Four.

MUSIC AND THE DRAMA

COVENT GARDEN.—The revival of Beaumont and Fletcher's 'Spanish Curate' owes its success to the admirable personation by Farren of the curate *Lopez*, and of his sexton *Diego*, by Keeley; and it will repay the endurance of an otherwise heavy and disagreeable comedy, to enjoy the diverting scenes in which this pair of starving church mice bemoan their fate, and nibble eagerly at the tempting bait for their covetousness with which the gallant *Leandro* entraps them to promote his intrigues with *Amaranta*, the pretty young wife—or ward, as she is now represented—of the old lawyer *Bartolus*. The epithet "thin" seems to have haunted the author's fancy while conceiving the lean and hungry curate; he is characterized as a "poor *thin* thief;" the first words he utters are, "Thin world, indeed;" and he harps upon his "thin stipend." Farren looks an embodied exemplification of thinness—an anatomy of a curate, fee-famished. The sexton *Diego* is more fleshly and ravenous: his stomach is in active state of craving; his appetite rebels; he is impatient and open mouthed, and his talk is of fatness and feeding. The curate is hard, polished, and all edge; the sexton is blown with emptiness, coarse, and noisy; and the arid, angular style of Farren, and Keeley's unctious humour are exactly suited to the couple. The scene where *Leandro* presents the letter from the non-existent *Alonzo Tiveria*, and the sight of the ducats works such wonders on the memory of *Lopez* and *Diego*; and that where the sexton feigning to be dying, and makes *Bartolus* executor of a will of munificent bequests, while the curate is hardly able to contain his glee at the luxuriant fancy of *Diego*, are very laughable. The Spanish origin of the plot is evident in the sordid, knavish, and profligate characters, and this taints the humour and sentiment of the play; which is scarcely redeemed by the generous and chivalrous spirit of *Don Jamie* (re-christened *Juan*), who protects the abandoned wife and child of his brother *Henrique*, and braves *Henrique's* resentment, though he afterwards saves him from the murderous designs of the depraved *Violante*. This part of the story, however, is scarcely understood as it is acted, from the necessity of subduing its revolting features, and excites surprise only, not interest. Madame Vestris gives piquancy to the character of *Amaranta*, but Mr. C. Mathews, as *Leandro*, falls short of the fire and animation of the Spanish lover. Bartley, as *Bartolus*, is loud and boisterous, instead of sly and specious; and is too hearty for the jealous, miserly old rogue of a lawyer. Mr. Anderson is a gallant looking cavalier; Miss Cooper—a recent addition to the company—plays the boy *Ascanio* with a pains-taking earnestness; and Mrs. Brougham, as *Violante*, bears up as well as she may against a formidable character and a sumptuous dress. The costumes are not at all points correctly Spanish, though the principal persons are appropriately dressed: and the scenery is in good taste.—The comic scene between Keeley and Charles Mathews, called 'Two in the Morning,' is a version of the French Vaudeville 'Passé Minuit,' and those who have seen the original cannot but feel the inferiority of the English actors, in the article of bye-play.

HAYMARKET.—Lord Byron's uncomfortable tragedy 'Werner' has been played here, with Mr. Macready and Mrs. Warner, as *Werner* and his wife, to introduce Mr. Wallack in his old part of *Ulric*; but the harsh, violent melo-dramatic style of Mr. Wallack, not refined by his American practice, does not accord with the intellectual power of Macready's personation: he would become the part of *Gabor* much better, which Mr. Phelps played with characteristic roughness and energy, though his manner lacked the reckless gaiety and cordiality of the soldier of fortune. Mrs. Fitzwilliam has been playing here a few nights, and appeared in a stale and pointless farce, which appears to have been produced at the Haymarket only, as a passport to the American stage, where it will not be "out of place."

OLYMPIC.—This little theatre has been re-opened by Mr. Butler, with a company the ornament of which is the array of young ladies, foremost amongst whom in point of talent, as well as personal attractions, is Miss J. Mordaunt, who appears to great advantage in a pleasant little piece, called 'My Grandmother's Estate.' Mr. Balls, a spruce and active light comedian, and Mr. Roxby, a laborious performer of practical buffooneries, Mr. Ross, a low comedian, with a small person and voice to match, and Mr. Horton, a walking gentleman, together with Mr. Baker, who is quite lively here, and Mr. Butler himself, constitute the strength of the male part of the company. The staple of the entertainment are favourite five-act plays cut down to three, and burlettas of the slightest construction.

ADELPHI.—The Adelphi, decorated with a lofty new front, designed in a style suited to a theatrical dram-shop, has opened with a sanguinary melo-drama of Revolution, in which Mr. Yates plays *Robespierre*, and Mrs. Yates, who has returned to the stage after a long and severe illness, his intended victim; the scenery and costumes are well got up; but the revival of 'Jack Sheppard' has been necessary, to propitiate the taste of the frequenters of the Adelphi. That inimitable pantomimist of gymnastic humour, Wieland, exhibits his antics here, but he commits the twofold mistake of letting his face be seen and his voice be heard.

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"Words," says Mr. Greenough, in his address to the Geographical Society, May 24th, 1840,—"words following words in long succession, however ably selected those words may be, can never convey so distinct an idea of the visible forms of the earth as the first glance at a good map. Of all contrivances hitherto devised for the benefit of geography, this is the most effective. In the extent and variety of its resources, in rapidity of utterance, in the copiousness and completeness of the information it communicates, in precision, conciseness, perspicuity, in the hold it has upon the memory, in vividness of imagery and power of expression, in convenience of reference, in portability, in the happy combination of so many and such useful qualities, a map has no rival." This is the opinion of a gentleman of first-rate knowledge and experience, and though energetically, and indeed eloquently, expressed, it is not in the slightest item exaggerated.

This is true not only of the general map of the world, but of the most limited topographical representation, such as the map of a parish, or the plan of an estate; and as the general map is the index to universal knowledge, so the local map is the index to the knowledge of that locality of which it is a delineation. *To every party in authority, a map of the space over which that authority extends is an indispensable requisite. The Bishop, for instance, should possess a map of his diocese, the Clergyman of his parish*, and so on with every one in sacerdotal authority. In civil matters it is the same: the *Lord Lieutenant should have a map of his county*: AND SO ALSO SHOULD EVERY COUNTY OFFICER. A map of the county should also be displayed in every COUNTY HALL and every SESSIONS HOUSE; and IN THE PUBLIC ROOM OF EVERY INN there ought to be *not merely a map of the county, but a map of a very considerable extent of the environs*, and having the town where the inn is situated as nearly in the centre as possible. Nor is the map less essentially necessary for all BANKING HOUSES, INSURANCE OFFICES, PUBLIC ESTABLISHMENTS, and LITERARY INSTITUTIONS; for the LIBRARY AND EVEN THE PARLOUR OF EVERY GENTLEMAN OF PROPERTY AND INTELLIGENCE; for the WAITING-ROOMS AT RAILWAY STATIONS, and other means of transit; and in short, FOR EVERY PLACE OF PUBLIC RESORT in which parties may assemble. To travellers, whether for business or for pleasure, the convenience and the saving of time by means of such maps would be almost incalculable.

Such are a few of the leading uses of a map, and of the parties to whom such a document is OFFICIALLY INDISPENSABLE; and it would be very easy to extend the enumeration to any length, as the map bears upon everything terrestrial.

The MAP constructed from the ORDNANCE SURVEY of England and Wales, so far as published, combines all the good properties of *a general map of the country, a county map, and a map of any particular district or locality*, whether of larger or smaller extent. It is, in fact, *the* Map of England and Wales, and the only one upon a large scale, and furnishing minute details, that can at all be relied upon for accuracy. *At the same time its price to the public is so low that no private constructor of maps could afford to copy it accurately as a simple engraving, even with the advantage of the survey, for less than at least double the price.* Thus it is a national work in the best sense of the term, and one of the most useful national works in existence.

The scale is one inch to the mile; and the square miles in any portion of the map are easily found by simple multiplication of the length and breadth in inches; and this uniformity adapts it remarkably well for general use. *Any one who wishes to obtain any district whatever*, has only to consult the small index map, (A COPY OF WHICH IS GIVEN WITH THE PRESENT NUMBER OF THE ATHENÆUM,) for the number of the sheets, or parts of sheets, required; and the marginal references will show the total cost of the sheets, which may of course (if required) be mounted according to the taste and inclination of the party.

In order to show the advantages which, independently altogether of the intrinsic value of this map, result from this convenience of publication, we may mention one or two examples:—

1. Suppose a map of the Environs of London more extensive than the ordinary ones is desired, this will be obtained by joining together sheets 8, 6, 1, 7, and the southern halves of 46 and 47; by which a map seventy inches long and sixty inches wide will be obtained, with the metropolis almost exactly in the centre; and the price, considering the extent and value of the map, will be seen to be *exceedingly moderate*.

2. If a map showing the whole navigation of the Thames, and adjoining shores from Harwich to Folkestone is required, an equal number of sheets will give it up to the centre of the metropolis; and as some of the sheets contain less work, the price will be cheaper.

3. If the navigation of the upper part of the Bristol Channel, and the interesting countries on both sides, is required, sheets 19, 20, 35, 36, and the southern halves of 42 and 43, will give what is requisite, including the river from the commencement of the Somerset coast to Gloucester, with all the more important districts having direct communication with the navigation of this important channel.

4. From the map being obtainable in any portion, the sheet or sheets in which they are locally interested cannot fail to be of the greatest utility to the officers of the Poor-Law Unions and Commissioners of Tithes; to Railway companies, existing or projected; to turnpike trusts; to gentlemen of landed property (who all should possess the map of their estates and environs); to solicitors, surveyors, auctioneers, and all others whose business depends upon, or is connected with, a district of country. It is at the same time *by far the best guide map to the occasional tourist; and the respective counties ought to become an indispensable article of social and intellectual furniture to every resident family of respectability.*

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